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UNIQUE IDENTIFICATION(UID) PROJECT FOR INDIVIDUALS OF ETHIOPIA

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ABSTRACT

Assigning Unique Identification(UID) Number or Social Security Number(SSN) to an individual has already been implemented in many countries since long back. The concept of identifying an individual using a ID has been revolutionary and has been a successful project in all the areas concerning to the benefits of the individual as well as government of a country.

In this paper we concentrated on Ethiopia, its back ground, socio –economical standards and the use of Unique Identification Number and its impact in the present situations.Keeping in view thepresent scenario's in Ethiopia, the project can be a beneficiary and away out even for the government to know exactly the people who are below the poverty line and can extent its subsidies only to the genuine citizens. So far there is no centralized database for the country where they can analyse, plan and execute the policies made by the government.

We proposed assigning a UID to the individuals of Ethiopia which can solve various issues and also benefit the country to be placed as an outstanding icon of the continent. We pointed few areas as sample where this UID can he handy for the government. UID of an individual will be a unique number which will be stored in the centralized database with which the government comes to an understanding of the citizens in the country.

INTRODUCTION

Ethiopia- the fastest growing country in the African continent is now open for international market. Being the top from the under developed countries of the world, Ethiopia is still struggling to face the global challenges. To be a centre of attraction of the continent Ethiopia has to analyse their country status among the globe, the citizen's socio-economic scenarios and also the census and statistics of the country. To maintain all these the country needs a centralized database and the need of identifying citizens of the country individually.

One solution for this which we think is to assign a unique identification (UID) number or a social security number(SSN) for each individual and track their day to day transactions and record them on a centralized database. This might help the country in planning, analysing and executing government benefits only to the eligible people. This will also help the country in identifying the misuse of the subsidies and the benefits given to the needy.

NATIONAL SCENARIO OF ETHIOPIA

Ethiopia has a total population of 91.73 million (2014) and is one of the poorest countries in the world,with a per capita annual income of US$ 90 (2003). Percentage of population living in urban areas is 17% and population proportion between ages 30 and 70 years is 26.4% (2014).

Ethiopia is experiencing recurrent problems as a result of droughts and conflicts. Drought has become a chronic occurrence, affecting the country periodically (once every 7–10 years) since 1983.
Periodically, the dry lands experience heavy seasonal rains, which cause flooding leading to internaldisplacement and increased risk for diseases related to stagnant waters such as malaria and cholera.

The widespread food shortages associated with these natural disasters further results in malnutrition and under nutrition. In order to address chronic poverty and persisting food insecurity, the Ethiopian government is since 2003 conducting a massive resettlement programme, under which 2.2 million people will be moved to more productive areas in future.

Ethiopia is currently hosting some 124,000 refugees from Sudan, Somalia and Eritrea. While there areno official numbers of internally displaced persons, it is estimated that about 168,000 persons have been displaced by

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conflict and ethnic tension. Refugees and displaced people are especially vulnerable from a health perspective because of their living conditions and reduced access to health services in recent times.

Ethiopia is a federal democratic republic state, divided into nine National Regional States and the two Administrative CityCouncils:

(a)   National Regional States: Tigray; Afar; Amhara; Oromia; Somalia; Benishangul-Gumuz; Southern Nations, Nationalities and Peoples Region (SNNPR); Gambella;and Harari;

(b)   Administrative City Councils: Addis Ababa; and Dire Dawa.

Each state is headed by a president assisted by heads of various regional bureaux. The states are responsiblefor their own legislative and administrative functions, except for foreign affairs and defence.

The National Regional States as well as the Administrative Councils are further divided into 75 zones,551 *woredas* (i.e. districts) and approximately 10,000 *kebeles* (i.e. counties). Each region has a Regional Health Bureau (RHB) and *Woreda* Health Office.

In 2004/05, there were 126 hospitals, 519 health centres, 1,797 health stations, 2899 health posts and1,299 private clinics in the country. Although there is no data available on the number of traditional healers in the country, it is well known that many Ethiopian households use them for various health problems.

WHAT UID IS ALL ABOUT?

An UID can be a number which can be 12 (or more)digits, randomly generated but unique, individual identification number issued by the Unique Identification Authority of Government body.Any individual, irrespective of age and gender, who is a resident in the country and satisfies the verification process laid down by the Government body can enrol in the UID program.Enrolment for UID is by appointment at residents' convenience or at the decision of the body. There won't be any deadline forenrolment.Each individual needs to enrol only once. There won't be any charge for registering.

The verification processused for enrolmentrequiresresidents to appear in person to apply for an UID. Resident's need to complete an UID enrolment form.In addition, verification of UID enrolment uses multiple sources of information including demographic and biometric information. Demographic information includes; name, date of birth, gender, address, parent or guardian information for children, and contact information such as email addresses and phone numbers. Biometric information includes; photograph(s) or facial images, finger prints, and iris scans. Once an individual resident receives his/her UID it can be used as a proof of identity and address, i.e. authentication, anywhere in the country. This system has been followed by many countries in the world.

Once a resident's UID enrolment has been verified a letter containing the resident personal information, enrolment number, UID number, etc. is sent to the address the Resident provided during enrolment. In addition, Residents can download both their UID letters and cards online. The Information Technology Act of 2000 established legal recognition of digital signatures so that an UID letter received via Post and an e-UID downloaded from website are equally valid and can be used interchangeably.
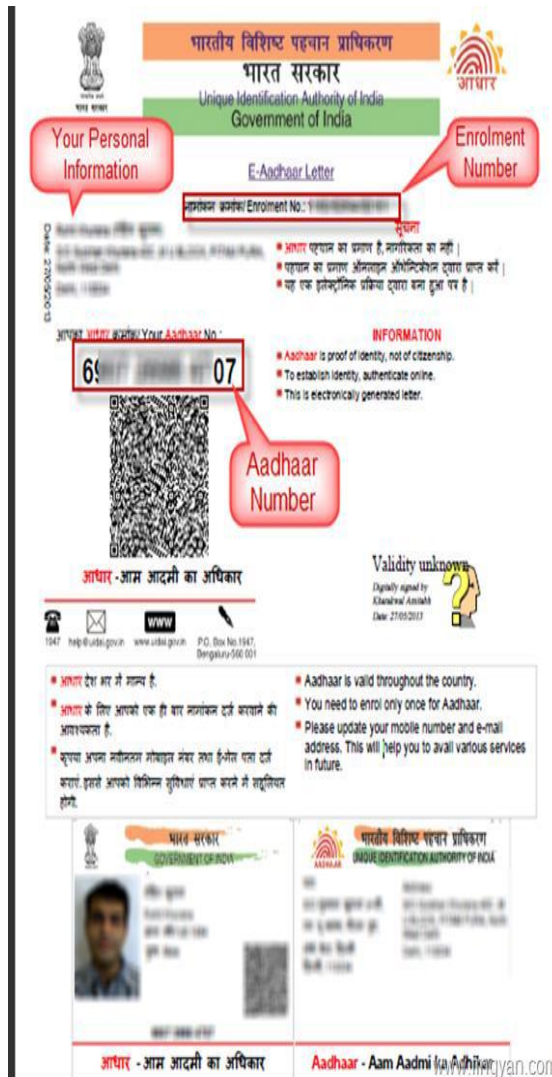
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Fig 1: - Sample UID issued by the Government to an individual (India)
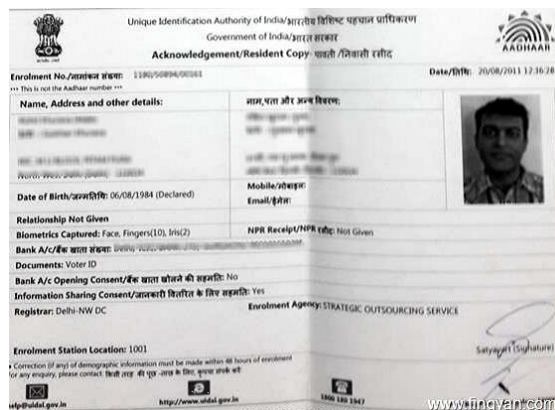
Fig 2: - Enrolment receipt given to an individual after capturing the data (India)

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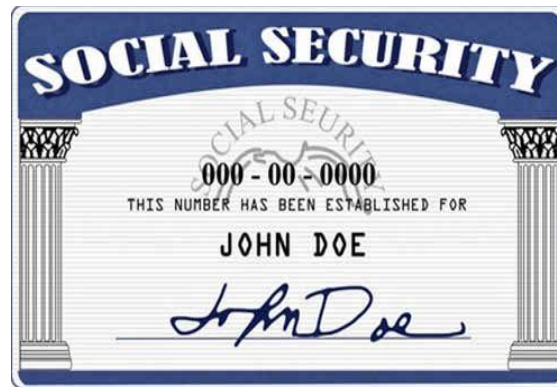
Fig 3: -Sample Social Security Number (SSN) of an Individual of USA

BENEFITS OF UID IN ETHIOPIA

Case1: -Identifying The Refugees And Migrants
Ethiopia as of now is facing many problems both internally and externally. The internal conflicts that has been taking place since years and the pressure that is generated from the neighbouring countries make Ethiopia unstable. In either cases there is a common issue of migrations of Ethiopian citizens to other countries and people from other countries try to enter into Ethiopia. The refugees mainly recorded are from Sudan, Somalia and Eritrea.

On using UID for each individual of Ethiopia the government can easily identify the person who migrates and also identify the persons those enter illegally. In both the cases for example if a person needs to open a bank account or want a house for rent or plans to buy a land or wants to start a company they have to show their UID to the concerned department. If the person is from other country and entered illegally he won't be having UID issued by the government of Ethiopia and can be easily caught. On the other hand, if a person from Ethiopia migrates to other country the government can block his UID and again if the person enters Ethiopia he has to use his UID for any purpose and once if the UID is found to be operated he can be easily caught by the government officials.

Case 2: - Identifyingthe Beneficiaries Of Government Subsidies
As discussed earlier Ethiopia is highly effected by droughts for every 7-10 years. If the government plans to help the citizens by providing some products on subsidy, they can use this UID as UID records all the activities of an individual. If the person owns a house or owns a car, he won'tbe considered as poor and is not eligible for claiming the subsidy given by the government.Thus combating the misuse of resources to the ineligible persons. This works as the person while purchasing a car or a house has to submit his UID and the transaction will be recorded in the UID database. Hence the property of the government can be properly used.

Case 3: -Identifying The Diseased Percentage
As per the statistics the probability of dying between ages 30 and 70 from four main Non-Communicable Diseases (NCD) is 15% (2014). The four main NCDs considered were Cancers, Diabetes, Cardiovascular diseases and Chronic respiratory diseases.

The progress in health status of the population indicates that about 80% of diseases in Ethiopia are attributable to preventable conditions related to infectious diseases, malnutrition; and personal and environmental hygiene. The prevalence of TB in Ethiopia is estimated to be 241 with incidence of 247 per 100 000 populations. The adult HIV prevalence is 1.5% in 2011 (4.2% for urban and 0.6% for rural) and is higher among females (1.9%) than males (1%). Environmental risk factors contribute to 31% of the total disease burden in the country.

If the government wants to give any medical aid or any medicine for free to the diseased based on their financial status, there is no particular record with the government to estimate the people who are below the poverty line.By providing the UID to all the individuals the problem can be solved, As the UID tracks all the purchases and sales of an individual, the people who are really poor can be identified.

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Case 4: - Provides Regional Statistics

Ethiopia consists of nine (9) regions where the funds and treasure is generated by the regional bodies itself. The fund is also utilized only for that region. Only few areas such as federal, health, education etc. will be shared by the Ethiopian central government. For any representation from the region, central government responds with a helping hand.In order to estimate the regional statistics and also to understand the living style and expenditure ranges of the people, UID serves a lot.

Before allotting the funds to any place or region, the central government can have a look at the statistics and then analyse the situation there in the region. UID is the only solution which serves at its best rather than following the manual reports produced by the officials that can be easily manipulated.

Case 5: - General Purpose Analysis And Census

The other benefit that we have with UID is identifying a person individually. These may be for his personal benefits. For example, any individual who needs to activate a new SIM card has to submit a copy of his UID. On any report received against this SIM number, the person can be easily identified.

If a person needs a bank loan or if he is absconding without clearing the bank loan can be easily traced when he uses his UID for any transaction. Not only these but for any general purpose usages like education loan or purchases of a vehicle etc. can be monitored using UID.

HOW THE PROJECT CAN BE IMPLEMENTED?

Once the if the user enrols himself in the UID issuing centre, all the data which includes Iris, Bio metric and facial scan will be now captured and stored in a centralized database of the government.Figure 4illustrates how UID enrolment centres capture all this information in a biometric database.

The overall flow of the data that happens at the UID issuing centre can be displayed in the following chart. We have taken three actors in this chart i.e. enrolment agency, resident / individual and registrar who finally confirms and stores the data.

The overall mechanism that takes place in issuing a UID can be given as follows:
- Individual presents himself in the issuing centre
- Fills in the application form provided at the centre (Consists of demographic details).
- Iris details are scanned.
- Finger print details are scanned
- Facial scan has to be done
- A receipt will be issued after completion of scanning all the details. (Receipt contains Enrolment number, UID number, photo of the individual and also all the details that were scanned.

Now this receipt will serve as a UID of the individual and can be accepted anywhere in the country. A detailed card containing the details issued by the government will be sent through post or can be easily downloaded from the website on entering the enrolment number provided on the receipt.
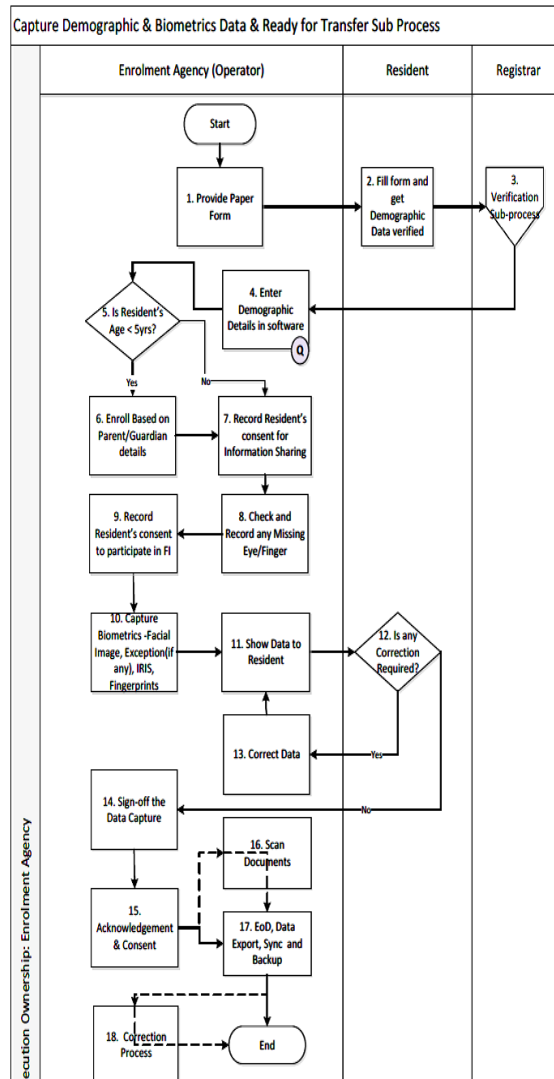
Fig 4: - Data flow at the UID issuing centre

Since then he has to use his UID for any transactions that he does daily. These transactions will be recorded and stored in the centralized government database.

TECHNOLOGY'S USED
Many technologies have been developed specifically for the purpose of generating biometrics that can be used for authentication purposes. Beyond developing technologies, it is important to ensure that sufficient reliable, safe, and secure devices are available to support the requirements of a program.

To fully utilize authentication via biometrics a process called "enrolment" must take place firstand a biometric authentication system must be used (Bromba, 2012). The enrolment process creates a biometric database for use in verifying identity.

A biometric authentication system then verifies identity using a biometric capture devicesuch as a camera to detect the biometric characteristic, a processing unit such as a computer that extracts and processes data from the capture device, and software for comparison to existing biometric data in an enrolment database. As an example of reliability, iris scans are considered to be highly reliable because of the uniqueness of an individual's eyes, i.e. the chance of a false identification using an iris scan is purported to be 1×1078(Wilson, 2005). Systems based on multimodal biometrics, i.e. *the combination of two or more biometric characteristics such as finger prints and iris scans, is even more accurate(Iritech, 2015) and we use the same for issuing UID's to an individual in this project.*

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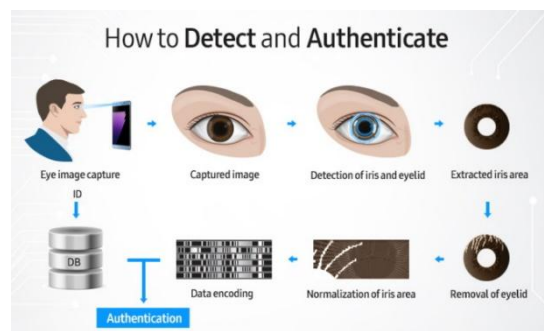
a) Iris Technology

Iris recognition is accomplished by analysing the random pattern of an individual's iris via an iris scan and the mathematical analysis of the data acquired through that scan. Figure 5 illustrates the parts of the human eye. As shown in Figure 5, the iris is a ring around the pupil or centre of the eye. Like a snowflake, no two irises are alike; each has its own distinctive pattern. Further, because the iris lies under the cornea it is protected from damage and wear. This makes an iris scan more reliable than a finger print pattern which can be altered.

Iris scanning is an ideal way of biometric identification since the iris is an internal organ that is largely protected by damage and wear by the cornea. This makes it more attractive then fingerprints which can be difficult to recognize after several years of certain types of manual labour.

Figure 5 shows a camera's view looking into a human eye during an iris scan (Hartley, 2011); and, Figure 6 illustrates how a camera is used to acquire an iris scan at an enrolment centre (Ganguly, 2015). As can be seen, the process does not have any lasers or bright lights. There is no contact (UIDAI, 2012).
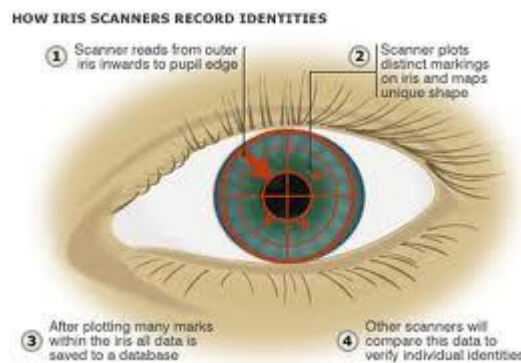
Fig 5: - The internal parts of a human eye


Fig 6: - Iris Scan process and mechanism

Fig 7: - Collecting Bio-metric samples of an individual

b) Fingerprint Technology

Fingerprint patterns have been used for a long time to identify individuals. According to the Scientific Working Group on Friction Ridge Analysis, Study and Technology (SWGFAST), a fingerprint is basically the impression made by the ridges of a finger. In the past this has been done by a forensics expert in fingerprint pattern analysis. Today the process of capturing, analysing and storing fingerprint patterns is being automated. And, associated standards for this automation have been created(SWGFAST, 2009).The technology utilized to automate the

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process includes a fingerprint scanner, as shown in Figure 8, which captures a digital image of thefingerprint pattern. This scan **is** digitally processed to create a biometric template of the fingerprint pattern which is stored in the biometrics database to be used for matching during identity authentication(UIDAI, 2012).
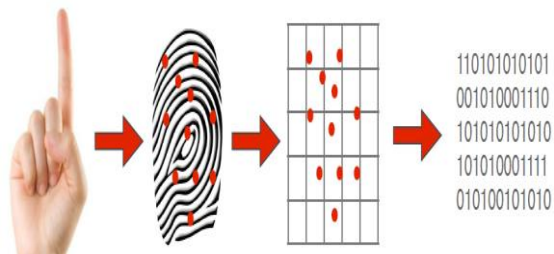
Fig 8: - Finger print scanning and data collection

c) Facial Recognition

Face recognition is often used as part of biometric authentication. Closed circuit television (CCTV) video surveillance, human computer interface and image database management all capture, analyse and store facial images used by facial recognition programs. A camera that can take a clear crisp photograph of the face is required, e.g. one with 2 megapixels or more spatial resolution. Once the image of a face is acquired by a camera the content is transformed into features which can be compared to available biometric facial data for the purpose of identity authentication.
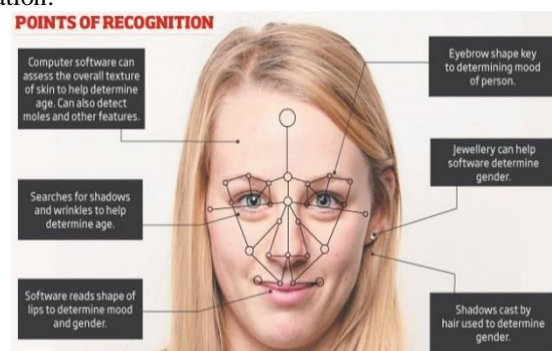
Fig 9: - Facial Recognition process

CASE STUDY BY UNDERSTANDING HOW UID IS IMPLEMENTED IN OTHER COUNTRIES (for example INDIA).

We have taken India as an example as it is the world's largest biometric identification system being used now and is successful in its implementation. To overcome corruption, to develop a comprehensive and reliable identification system, the Government of India embarked on the "Aadhaar" program.

An Aadhaar number is a unique identity number issued by the Unique Identity Authority of India (UIDAI) to individuals.India spends about "$60 billion annually on social programs, subsidies, and welfare benefits" (Daugman, 2014), only half of which reaches India's poor; the rest is "siphoned away by corrupt officials and middlemen"(Nadhamuni, 2012).

The Aadhaar project establishes a unique number identifying each individual that remains valid throughout the individual's lifetime. Aadhaar is a random 12 digits' number not associated with any personal identifiers such as caste, creed, religion or geographic location.

No individual can have more than one Aadhaar. Aadhaar is portable, i.e. it can be used universally for a wide variety of services at a number of agencies. For example, Aadhaar can be used to receivebenefits payments such as Social Security Pension benefits. Identity verification is a routine problem in India and Aadhaar sounds like a fool proof solution to provide residents with access to banking services, mobile phone connections, Government benefits and subsidies and in the future other non-Governmental services. Aadhaar is the world's largest ID platform.

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As of April 20, 2015, more than 82 crores, or over 820 million, people had a unique Aadhaar number established for them(Government of India, 2015).

In 2005 the Reserve Bank of India established the Board for Payment and Settlement Systems. The Board issued a vision document including an umbrella institution for all retail payment systems in India(National Payments Corporation of India, 2010). Out of this vision, the National Payments Corporation of India (NPCI) was incorporated as a Section 25 company operating for the benefit of its member banks and their customers. NPCI's vision is to be "the Best Payments Network Globally"(National Payments Corporation of India, Background and Organisation, 2010).

The Aadhaar Payments Bridge (APB) System is a payment system that utilizes Aadhaar Numbers issued by UIDAI and Institution (or Issuer) Identification Numbers (IIN) issued by NPCI. The APB System, launched in 2011, uses Aadhaar and IIN numbers to move Government subsidies and benefits into Aadhaar Enabled Bank Accounts (AEBA) of intended beneficiaries(National Payments Corporation of India, Frequently Asked Questions (FAQs) By Customers: Aadhaar Payment Bridge (APB) System, 2013).

By the end of December, 2014, over 100 million Aadhaar numbers had been linked to bank accounts. Beyond this the Aadhaar biometric database, the largest biometric database in the world, alsoserves users ranging from LPG (Gas) consumers, Rural Reconstruction-Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) workers, public distribution system (PDS) recipients, remittance and scholarship beneficiaries, etc., all via Aadhaar numbers through the Aadhaar Payments Bridge System(Mayhew, 2014).

Despite impediments the Aadhaar program has attained several major milestones. In a press release dated September 10, 2014, UIDAI reported that the Cabinet Committee on Economic Affairs approved Phase-V of the Unique Identification Project making enrolments of 100 crores, that is the enrolment of 1 billion people, possible in 2015(UIDAI, Cabinet Committee on Economic Affairs approves, 2014).
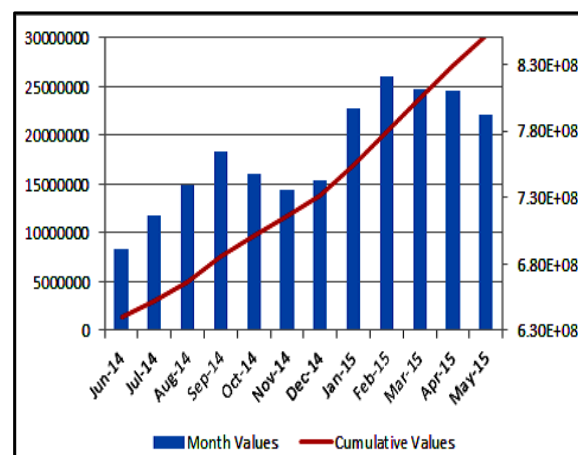
Fig 10: - Growth in Aadhaar Numbers Established between June 2014 and May 2015(UIDAI, Aadhaar Generation Progress in India, 2015)

Another major milestone, 100 million Aadhaar numbers having been linked to bank accounts ofAadhaar holders,has been reached with enabling these individuals to receive government welfaresubsidies and other payments directly into their bank accounts(UIDAI, 10 crore Aadhaar's linked to Bank Accounts, 2014). Establishing a link between an Aadhaar number and a bank account makes it easier for the government to identify genuine beneficiaries and route welfare payments and subsidies directly into their bank accounts.

CONCLUSION
Issuing unique identity number (UID) to the individuals has several benefits and can help the country against corruption and misuse. The project can also help us in showing the world the scope and growth of Ethiopia in recent years.

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This project can address various issues concerned to the country and also avoid illegal migrations that can affect the security as well as the economy of the country.

In this paper we have taken Ethiopia as it has huge scope for growth in the coming future. We are also sure that this project will be a cutting edge for the country. We hope that a country like India which is the second largest in population, was successful in registering 100million UID's into a centralized database, Ethiopia with a total population of 91.73 million can also be successful in no time

REFERENCES

1.   Bromba, M. U. (2012, November 2). Biometrics Frequently Asked Questions. Retrieved May 28, 2015, from Bioidentification: http://www.bromba.com/faq/biofaqe.htm#Biometrie
2.   Carter, J. (2011, May 8). The Glorious End of User Names and Passwords. Retrieved May 28, 2015, from Forbes: http://www.forbes.com/2011/05/05/user-names-passwords.html
3.   Daugman, J. (2014, May 7). 600 million citizens of India are now enrolled with biometric ID. Retrieved May 27, 2015, from SPIE Defense & Security: http://spie.org/x108321.xml
4.   Ganguly, B. (2015, March 18). File: Iris Scan - Biometric Data Collection - Aadhaar - Kolkata, India. Retrieved May 28, 2015, from Wikimedia Commons: http://commons.wikimedia.org/wiki/File:Iris_Scan_-_Biometric_Data_Collection_-_Aadhaar_-_Kolkata_2015-03-18_3662.JPG#file
5.   Government of India. (2015, April 20). K-11022/188/20150-UIDAI (Auth-II). Sensitisation Workshop on Aadhaar Seeding and Authentication Services. New Delhi, Delhi, India: Government of India.
6.   Hartley, D. (2011, June 1). How to Create a Safe Password? Retrieved May 28, 2015, from VR World: http://www.vrworld.com/2011/06/01/how-to-create-a-safe-password/
7.   Inst for Development & Research in Banking Tech, & Ernst & Young. (2013). Technology in Banking: Towards Improving Business Performance and Customer Engagement. Mumbai, India: Reserve Bank of India.
8.   Iritech, I. (2015, April 21). Multimodal biometrics - A more accurate identification system. Retrieved May 28, 2015, from Iritech Blog: http://www.blogiritech.com/#!Multimodal-biometrics-%E2%80%93-A-more-accurate-identification-system/c22wd/5535cc360cf2836c87e136b2
9.   Mayhew, S. (2014, December 26). Unique Identification Authority of India sees 100 million Aadhaar numbers linked to bank accounts. Retrieved May 28, 2015, from Biometric Update.com: http://www.biometricupdate.com/201412/unique-identification-authority-of-india-sees-100-million-aadhaar-numbers-linked-to-bank-accounts
10. Nadhamuni, S. (2012, September 13). Aadhaar: The Implementation of the largest national ID project in the world. Berkeley, California, U.S.A.: CSAS.Retrievedfrom https://archive.org/details/CSAS_Talk_September_13_2012#