1. The technological advancement in the field of biometrics is reaching new heights with each passing day. Some of the solutions offered by biometrics are being used to improve the lives of millions of Indian citizens. Can you identify some of them? What potential do you see in the use of biometrics in further utilising it in areas that are hitherto untouched in India? Comment.

Approach

Candidates here are required to write about the basics of biometric system and recent technological advancements in India, then try to highlight the potential application of the biometric system. Also in the end before conclusion write challenges associated with it.

Introduction

Biometric systems have evolved significantly over the past years from single-sample verification matchers to a wide range of multi-sample fully automated person recognition systems. Biometric technologies are becoming the foundation of an extensive array of highly secure identification and personal verification solutions.

Body

Biometric systems:

- Biometric Systems are automated methods of verifying or recognizing the identity of a living person on the basis of some physiological characteristics, like a fingerprint or face pattern, or some aspects of behavior, like handwriting or keystroke patterns.
- A biometric system is a technology which takes an individual's physiological, behavioural, or both traits as input, analyses it, and identifies the individual as a genuine or malicious user.

As the level of security breaches and transaction frauds increases, the need for highly secure identification and personal verification technologies is becoming apparent there is increase technological advancements and reaching new heights:

- According to a recent PING identity survey 92% of enterprise rank biometric authentication as an effective to secure identity data. Another survey by Spiceworks reports that 62% of companies are already using it and another 24% plan to deploy it within next two years.
- In India potential of biometrics application is very high. India is progressing rapidly towards digitalisation directed by innovations in the field of AI, Big data analytics.

Right now biometrics has find its application in variety of fields which are:

- The NCRB, which manages crime data for police, would like to use automated facial recognition to identify criminals, missing people, and unidentified dead bodies, as well as for "crime prevention". For example A new image of an unidentified person — often taken from CCTV footage — is compared to the existing database to find a match and identify the person.

- Automated facial recognition system being implemented by the National Crime Records Bureau (NCRB), is a component of Crime and Criminal Tracking Network and Systems (CCTNS). It is a way of recognising a human face through technology. AFRS works by maintaining a large database with photos and videos of peoples' faces.
- Recently, the Ministry of Civil Aviation's "DigiYatra" has started facial recognition for airport entry on trial basis in the Hyderabad airport. DigiYatra intends to offer air passengers a "seamless, hassle-free and paperless journey experience.
- During enrolment process, Unique Identification Authority of India (UIDAI) collects minimal biometric data in the form of iris and fingerprints. This has helped to exclude bogus beneficiaries of government schemes and eligible beneficiaries are targeted well hence quality of Service delivery system has improved immensely.
- NPR database contains demographic as well as biometric details. For implementation of "One nation One identity card".
- States like Andhra Pradesh Haryana have decided to provide smart card having biometric information instead of ration card to prevent counterfeiting for better service delivery and preventing leakages in PDS.
- In Border authentication it is used at border post to speed up border crossings using scanners. The retina or fingerprint scanners capture necessary information.

Potential use of biometrics:

- Child trafficking and child labour: Biometrics can be helped to defeat child trafficking and child labour if we have accurate information of all the child in nation. Even identifying and rescuing them would be easy and could be get them back to their family.
- Disaster management: India is very much prone to disaster as seen in recent cyclones like Fani, Gaja Rehabilitation of victims will be easier.
- Medical Field: Global healthcare has shifted away from its reliance on paper-based medical records toward use of electronic health records (EHR). It has immense potential to fight TB, HIV by identifying them and providing medical help.
- Counter terrorism and naxalism: Many times lack of identification and verification systems led to freeing of terrorist. Biometrics would help to identify them at airports, while creating fake documents etc thus help to arrest them. Identifying and mainstreaming Naxalite people can be done effectively through biometrics records.
- Organizations like the CBI have been using biometrics in criminal investigations for years. Today, biometrics is widely used by law enforcement agencies across the world for the identification of criminals.
- Banking Sector: Biometrics in banking has increased a great deal in the last few years and is being implemented by banks throughout the world. As global financial entities become more digitally-based, banks are implementing biometric technology to improve customer and employee identity

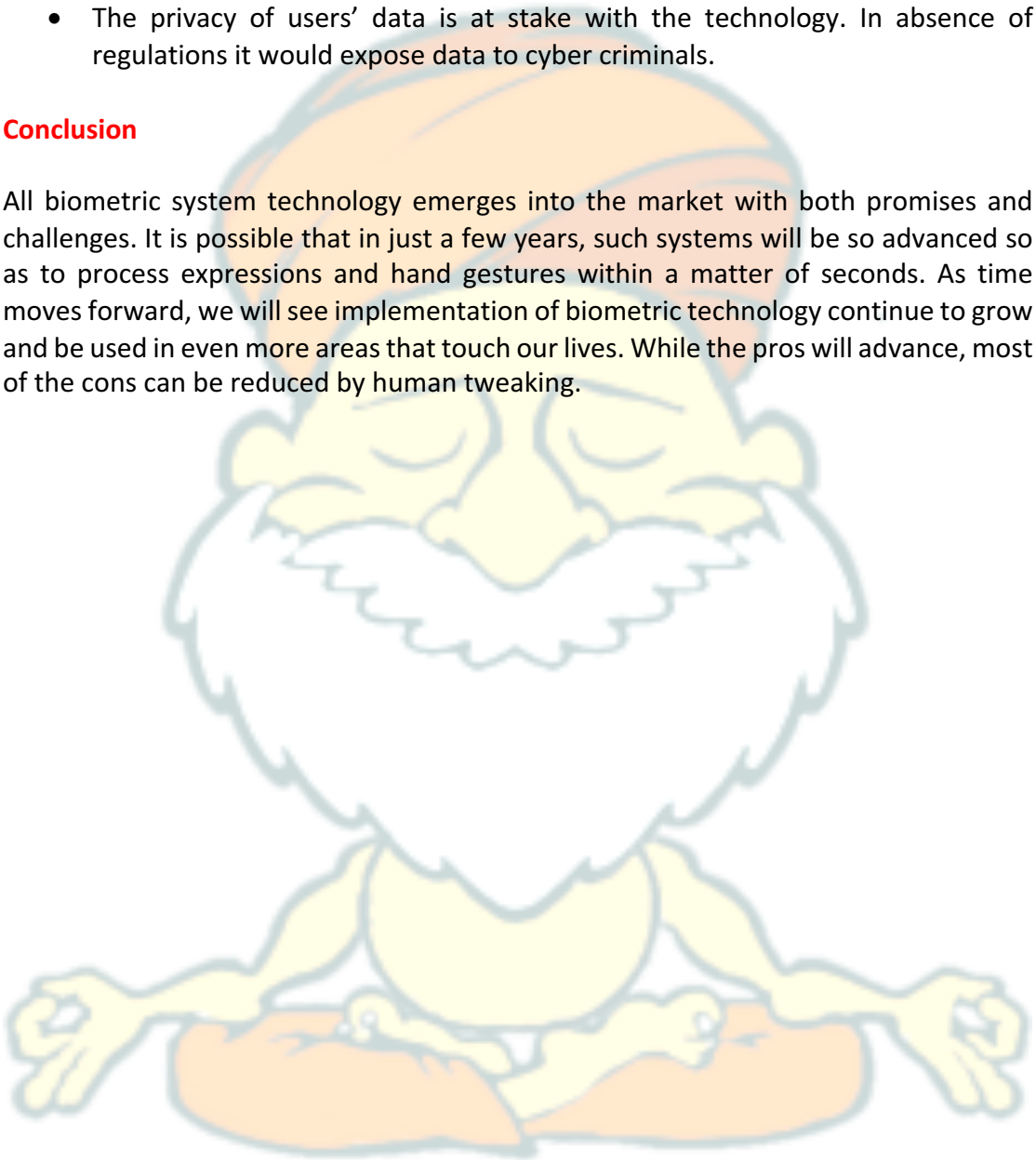
management in an effort to combat fraud, increase transaction security, and enhance customer convenience.

Challenges associated with biometric system:

- The most significant risk with the use of the technology is state surveillance. This raises concerns as it might be misused for political purposes.
- Software which analyses biometrics could potentially be put to use by some companies to prey on vulnerable customers.
- The privacy of users' data is at stake with the technology. In absence of regulations it would expose data to cyber criminals.

Conclusion

All biometric system technology emerges into the market with both promises and challenges. It is possible that in just a few years, such systems will be so advanced so as to process expressions and hand gestures within a matter of seconds. As time moves forward, we will see implementation of biometric technology continue to grow and be used in even more areas that touch our lives. While the pros will advance, most of the cons can be reduced by human tweaking.



2. The number of patents registered by Indian universities and research institutes are abysmally low as compared to their international counterparts. Why? Examine. Can you suggest some measures to address this situation?

Approach

Candidates here need to examine why Indian universities lacks innovation culture and why they have low patents registered internationally then before writing conclusion try to suggest some measures to address the situation.

Introduction

As per WIPO India registered far fewer research applications or patents than other top filing nations. The US chipset manufacturer, Qualcomm, submitted 1840 patents in 2016-17, whereas all the domestic institutes, collectively, only accounted for 781 patents.

Body

Most Indian universities lack focus on research, which in effect reduces them to teaching shops when it comes to international rankings. Let us examine Reasons for less patents:

- India spends just 0.7% of its GDP in 2016-17 on R&D . Japan spends 3.2%, USA 2.8% and China 2.1%
- University environment is not supportive to provide incentive for R&D and creation of patents. Students are more of job centric rather than putting efforts for innovation.
- University and industry linkages are minimal. A key factor driving patent filings in USA is industry funding of research in universities, in India it is largely restricted to IITs
- Human resource problem - Dearth of IP professionals is a problem related to the field of intellectual property itself. The recent requirement to set up Intellectual Property (IP) Centres in the universities do not find eligible personnel.
- In addition to this, India does not have a technology transfer legislation that would enable the transfer of know-how from university research labs to the private sector for commercialization.
- Various international treaties and trade agreements, along with with the legal-centric approach where law schools and colleges are the only institutions which mandate teaching these subjects, are reasons why the supply of IP professionals is not keeping pace with demand.
- Lack of patent agent - India has a poor patent agent density, with only about 2,000 registered patent agents currently in practice.
- Absence of courses in universities - Though online courses are available on IPR are available on the national programme on technology platform. There is

need of many courses are to be articulated for providing professional education.

- Researchers in India tend to focus on publishing their work in journals instead of patenting them.
- Time taken to get a patent is too large. On an average in 2017 it took 64 months to grant a patent compared to 22 months to China.

India's universities may not have the best research facilities, but between the Indian Institute of Science, the Defence Research and Development Organisation and the Indian Space Research Organisation, the country does host some research organizations of repute. Measure taken so for to promote research and development:

- The national Intellectual Property Rights policy 2016 as a vision document to guide future development of IPRs in the country.
- UGC has asked all universities to set up IP centres.
- NIRF ranking of universities which considers patent as a dominant factor could incentivise for more patent generation.
- India is committed to TRIPS agreement and various treaties of WIPO and others.
- Human capital development to strengthen and expand human resources, institutions and capacities for teaching, training , research and skill building in IPR.
- IPR awareness outreach and promotion create awareness about socio economic benefits of IPR among universities. Commercialisation IPRs to stimulate generation of IPR.
- Promotion of an environment of innovation in school's colleges. The academic curricula need to be revised.
- Collaboration with foreign universities regarding promotion of IPRs.
- Atal Innovation Mission including Self Employment and Talent Utilisation for promoting innovation and entrepreneurship- this must be implemented efficiently.
- Online courses on IPR are available on the National Programme on Technology Enhanced learning platform, they should be promoted
- National Assessment and Accreditation Council awards up to 24 points to an institute which sets up an innovation ecosystem and has a facility for identifying and promoting IPRs.
- Collegiality and a singularity of purpose among faculty members are important requirements to build that, where members need to be bonded by shared, research-related values and practices towards building a safe home for testing new ideas.

Other steps that can be taken

- In a dynamic field such as intellectual property, in order to create a band of qualified IP professionals, there should be a push towards post-qualification continuous education as well. Patent office should conduct patent exam frequently.
- One common requirement of "developing a research culture" is to move from a few isolated individual researcher projects to an environment where

research is so pervasive that it appears to be the activity of a large number of interconnected colleagues.

Conclusion

We need to build research culture that involves incorporating research into an organisational culture in our universities. To move ahead, institutions must get empowered to look within rather than being cowed down by a regulator, in whatever name we may call it. Better will be to have a facilitating body instead of a regulating one if our aim is to promote a research culture.

3. Quad fills important gap that has emerged in contemporary times. Do you agree? Substantiate your views.

Approach

Candidates in the start need to refer the context of statements given by the EAM of India and then try to write about basic information on Quad. As question demands to substantiate views with agreeing the statement candidates need to write how quad fills the new gap emerged in contemporary times.

Introduction

Quad today fills a very important gap that has emerged in contemporary times, where there are global or regional requirements, which cannot be filled by a single country. It cannot even be filled by one bilateral relationship, and which is not being addressed at the multilateral level as per EAM Jaishankar.

Body

Quad group:

- Quadrilateral Security Dialogue (Quad) is the informal strategic dialogue between India, USA, Japan and Australia with a shared objective to ensure and support a "free, open and prosperous" Indo-Pacific region.
- It is a grouping frequently seen in the international arena nowadays because of the current geopolitical situation in the world.
- As per Indian foreign policy QUAD is united by its democratic values and will remain an important pillar of stability in the Indo-Pacific region.

QUAD grouping is the start of a new, permanent and powerful regional grouping of like-minded democracies it tend to fill gap that has emerged in contemporary times in many ways:

- Indo Pacific is a decade old concept which has gained a significant currency recently. It is based on the understanding that the seemingly diverse theatres of the Indian Ocean and the Pacific Ocean with Quad members constituted together linked it can achieve strategic theatre and a unified strategic heft to tackle Chinese presence.
- Quad can recognises a strategic interconnection with regard to the common opportunities and common challenges shared by the Indian Ocean and the Pacific Ocean. Also it fulfils India's interest as an inclusive space for all stakeholders based on common responsibilities.
- Quad can be aimed at ensuring the re-establishment of an older order in the Indopacfic with democratisation of region will be helpful in destabilising Chinese assertion. It will also provide rule based order which is missing.
- Quad is an expression of the convergence of interests of many countries. It is in many ways a reflection of the contemporary nature of the world moving forward to put the Cold War type scenario behind us.

- Quad discusses maritime security and connectivity, in recent years. It has started to discuss technology issues, supply chain issues and vaccine production. There are also marine, sort of safety quality issues.
- Though India is part of Quad, it is not a formal alliance or any security architecture against China. Moreover, alliances are not even feasible in this globalized world based on complex interdependence. But QUAD membership reinforces India's multi-polar foreign policy.
- Members share a vision of an open and free Indo-Pacific. Each is involved in development and economic projects as well as in promoting maritime domain awareness and maritime security.
- India, as a mistress of the Indian Ocean, holds the responsibility to act as the net security provider in the Indian Ocean region. India along with likeminded countries of Quad can counter China's String of Pearls strategy and 'debt-trap' diplomacy.
- Moreover Quad can build around collective action in humanitarian assistance and disaster relief, monitoring shipping for search and rescue or anti-piracy operations, infrastructure assistance to climatically vulnerable states, connectivity initiatives and similar activities.
- QUAD is, through its intent, a label, a geostrategic vision and a foreign policy instrument for India to balance China via global networking. When a tipping point is reached, it provides scope for the forging of an alliance amongst the world's most formidable militaries.
- The maritime space is a lot more important to China than engaging in opportunistic land grab attempts in the Himalayas. A huge chunk of Chinese trade happens via the Indian oceanic routes that pass through maritime chokepoints. In the event of any chinese aggression on borders, India by cooperation with Quad countries can potentially disrupt chinese trade.

Wayforward:

- Quad should avoid becoming an Asian-NATO as being projected in the discussions. Such an alliance has the potential to start an arms race in the region. It should be more inclusive, taking into consideration the interest and concerns of littoral and ASEAN countries.
- India should not compromise on its strategic autonomy unlike Australia and Japan, which are bound by alliance treaties to the U.S.

Conclusion

Quad members have vowed to strive for an Indo-Pacific region to fill the gap with that of free, open, inclusive, healthy, anchored with democratic values, and unconstrained by coercion, sending a clear message to China against its aggressive actions in the region.