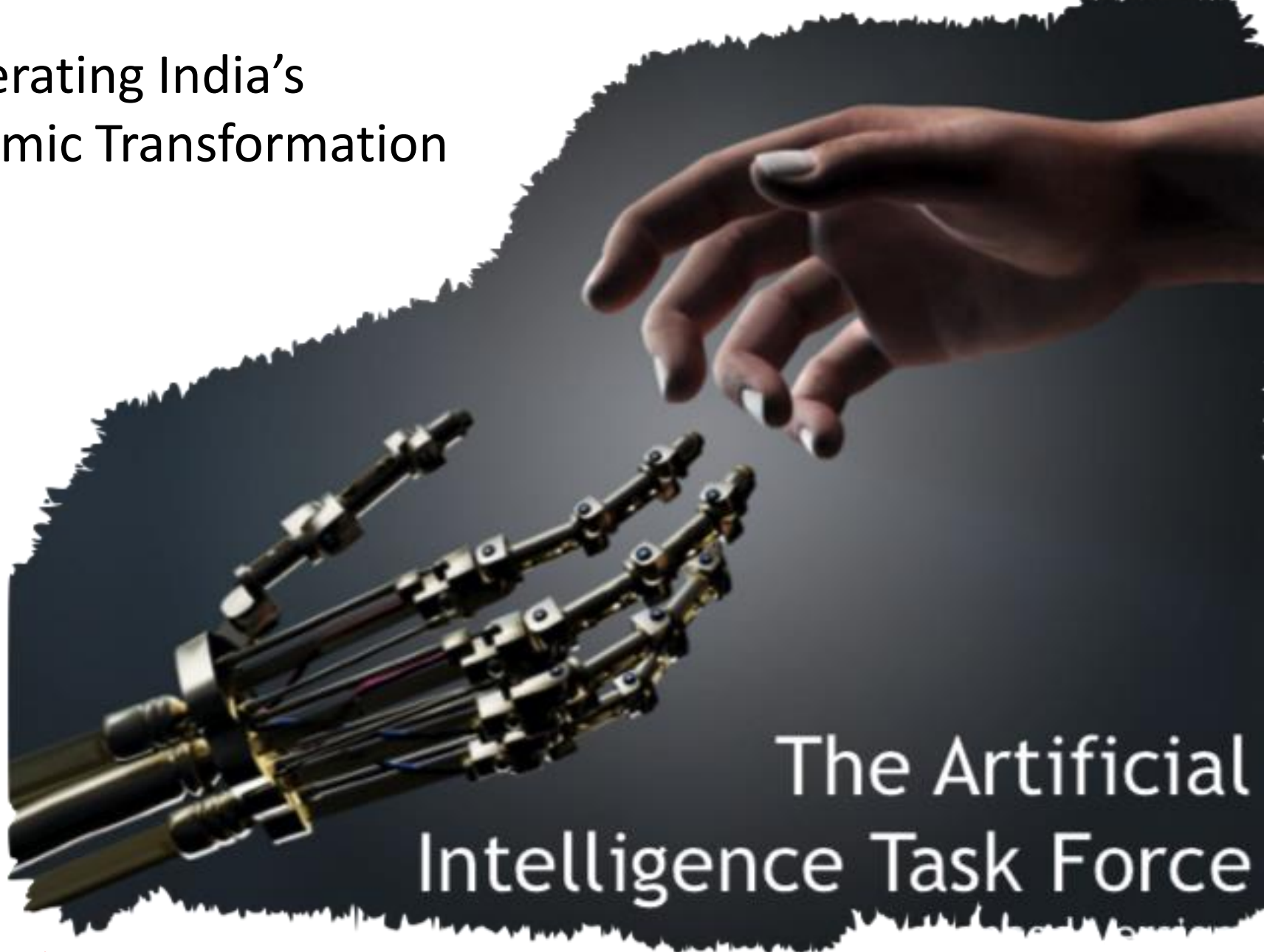


Accelerating India's Economic Transformation



The Artificial
Intelligence Task Force

V. Kamakoti
Shimla, 15 May 2018

What is AI?

- Systems that can make Intelligent Decisions.
- Early Systems where rule based
 - Decision based on current scenario and guided by rules.
 - Washing Machine example.
- Search Based Systems
 - Chess with multiple levels
 - Current state -> All possible next moves by System -> All possible next moves by Opponent for each move by system and so on..
 - Depth depends on levels.
- Data Availability fuels Machine learning
 - Digital India provides very big opportunity

MAN VS. MACHINE CHRONICLES

1997



IBM Deep Blue vs.
Kasparov

IBM RS/6000 32-node
server (Power2 + 8
dedicated chips)

~15000 W

2011



IBM Watson vs. Brad Ritter &
Ken Jennings

90 Power 750 Express servers (4
8-core CPUs)

~200000W

2016



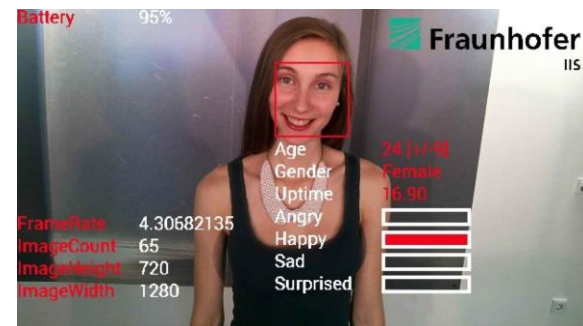
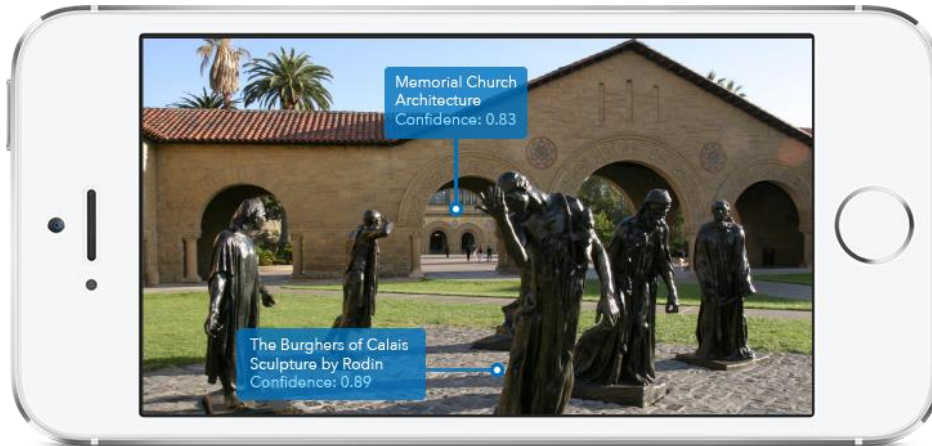
Google AlphaGo vs. Lee Sedol
(1920 CPUs, 280 GPUs)
~300000W



20W

Challenge: Embedded Deep Learning

- Need to embed intelligence in mobiles, wearables, IoT devices
 - Often not feasible to upload data to the cloud (connectivity, latency, energy, privacy)



AI Task Force – Key Facts

- Constituted on 24 August 2017.
 - Identify specific application areas, measures to promote R&D, Education and Capability development, suggest ways to reduce negative impact, and specific elements for policy and regulatory measures.
- Members
 - Interdisciplinary by design- Large industry and small startups, Academia, Legal, Medical, Robotics, Financial Services, Government/policy
- Website <http://www.aitf.org.in> soliciting public inputs
- Draft findings submitted to PMO and key Ministries in end-January 2018.
- Approved March 2018. Report available in
 - <http://dipp.gov.in/whats-new/report-task-force-artificial-intelligence>

TOR, Mission and Vision

- Mission
 - How can India leverage AI for economic benefit?
 - What should be the Policy and Legal Framework in Indian scenario?
 - Concrete 5-year (2018-2022) Recommendations regarding Implementable programs for Government, Industry and Research Institutions
- Vision
 - Embed AI in our Economic, Political and Legal thought processes and generate sufficient capabilities in the country to ensure India becomes one of the leaders in the AI-rich economy of the future.

Structure of Report

- Section 1: Introduction
 - What is AI ?
 - Current state of the field: International and National
 - Economic Potential and Social Impact
- Section 2: AI Grand Challenges relevant to India
- Section 3: Enablers for AI Entrepreneurship/Technology Product Commercialization
- Section 4: Ensuring Responsible use of AI – ethics and social safety
- Section 5: AI and Employment
- Section 6: Specific Recommendations to Government

Grand Challenges

Identified domains of relevance to India

1. Manufacturing
2. Fintech
3. Healthcare
4. Agriculture/Food Processing
5. Education
6. Retail/Customer Engagement
7. Aid for Differently Abled/Accessibility Technology
8. Environment
9. National Security
10. Public Utility Services

Asked 3 Policy Questions:

1. What are the areas where Government should play a role?
2. How can AI improve quality of life and solve problems at scale for Indian citizens?
3. What are the sectors that can generate employment and growth by the use of AI technology?

Grand Challenges: General

Data Management

- Collection,
- Validation,
- Standardization,
- Correlation,
- Archiving,
- Distribution,
- Security and Accessibility

AI Expertise

AI Awareness & Acceptability

Grand Challenges: Application Areas

Manufacturing

- Predictive Maintenance,
- Process Modernization,
- AI Machine-Man Hybrids

Health-Care

- Health-Care Data Repositories,
- Clinical Decision Support Systems

Agriculture and Food Processing

- Intelligent and Precision Farming,
- Prediction And Reduction Of Post Harvest Losses

Fin-Tech

- Risk Management,
- Predictive Investment,
- Consent Based Transactions

Education

- Feed Back Driven Intelligent Learning Mechanism,
- Intelligent Distribution Of Educational Resources

Grand Challenges Application Areas

Retail

- Consumer Data Protection,
- Fair Policies And Taxation For Small Retailers.

Environment

- Environmental Data
- Regulatory Policies,
- Environmental Monitoring And Prediction,
- Sustainable Environment Initiatives

Accessibility Technologies

- Social Issues Related To Deep Learning Technologies For Human Aid.

National Security

- Tactical Surveillance Technologies,
- AI Based Mitigation Of Cyber Attacks
- LOAC & Combat technologies

Public Utility Services

- AADHAR Based Data Analytics,
- AI Based Visualization Technologies For Social Projects

Ideas: Online Detection & Tracking of Potential Events

If more than average mobile phones are associated with a tower than there is a crowd and hence a potential event

Data Collection



Telecom operator will provide Tower Id, Number of current connections thru a feed, every 10 minutes



Data Patterns on how many mobile phones are expected on given TYPE of day in a particular tower will be learnt by a AI engine



TYPE: Weekends, week days, Festival day, Rainy day, Sunny day, A day followed by Holiday, A day preceded and succeeded by Holidays



Visualization will be done over City/Street maps



Drill downs, zoom features will be provided for ease of use



Hourly, Daily, week day, weekend, monthly average aggregations will be automatically calculated. This is a continuous process

Sample Data

Tower Master

TowerId	Name
1101	Island Grounds
1102	Marina Beach
1103	Light House
1156	Koyambedu

Regular Feed Data

TowerId	Time	#of Connections
1101	11.00	15020
1102	11.00	12015
1103	11.00	8904
1156	11.00	8976
1101	11.10	15720
1102	11.10	12715
1103	11.10	9604
1156	11.10	9676
1101	11.20	17579
1102	11.20	14658
1103	11.20	11149
1156	11.20	10942

Avg. Aggregates

TowerId	Day	Average
1101	9.00	12010
1101	10.00	15200
1101	11.00	14990
1101	12.00	15300
1101	13.00	16000
1101	14.00	16430
1101	15.00	15230
1101	16.00	13010
1101	17.00	12109
1101	18.00	11200
1101	19.00	9290

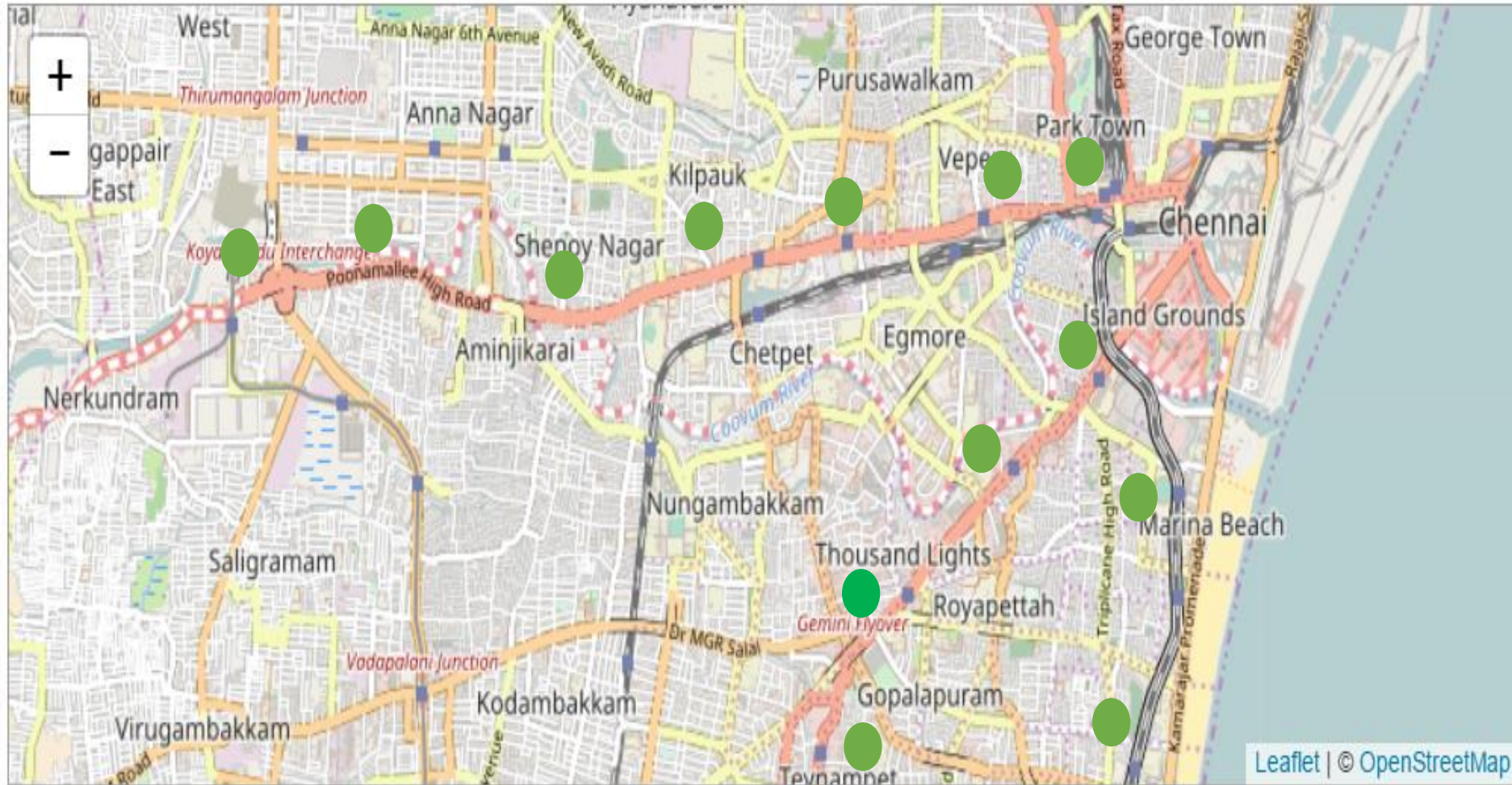
Lat-Longs for towers will be configured; data collected every 10 minutes, 6000 towers

Data volume: 864k/day, 6mn/week, 26mn/month, 315mn/year

Averages will be continuously updated thru auto-learning

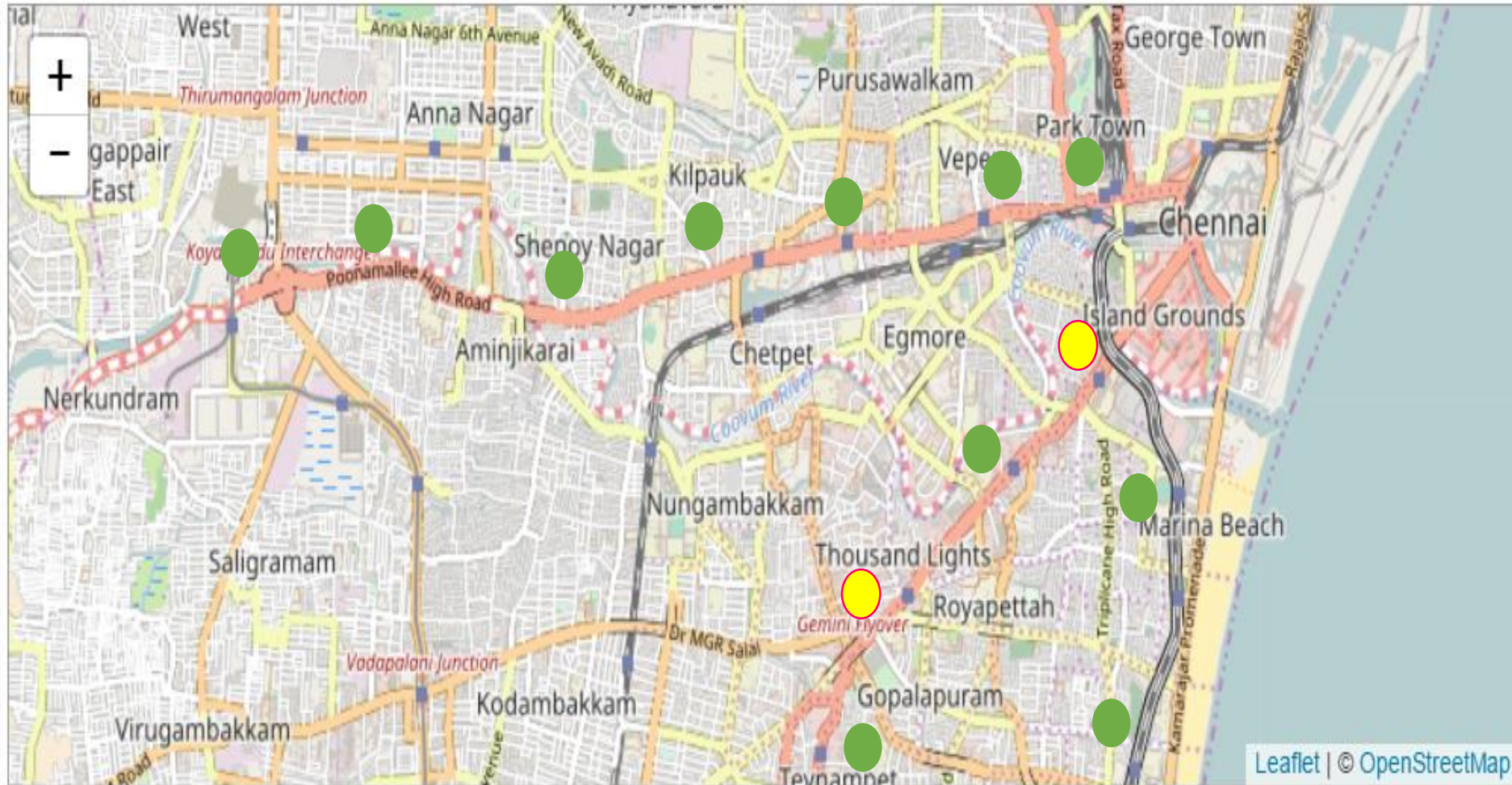
All towers are in green state

11.00



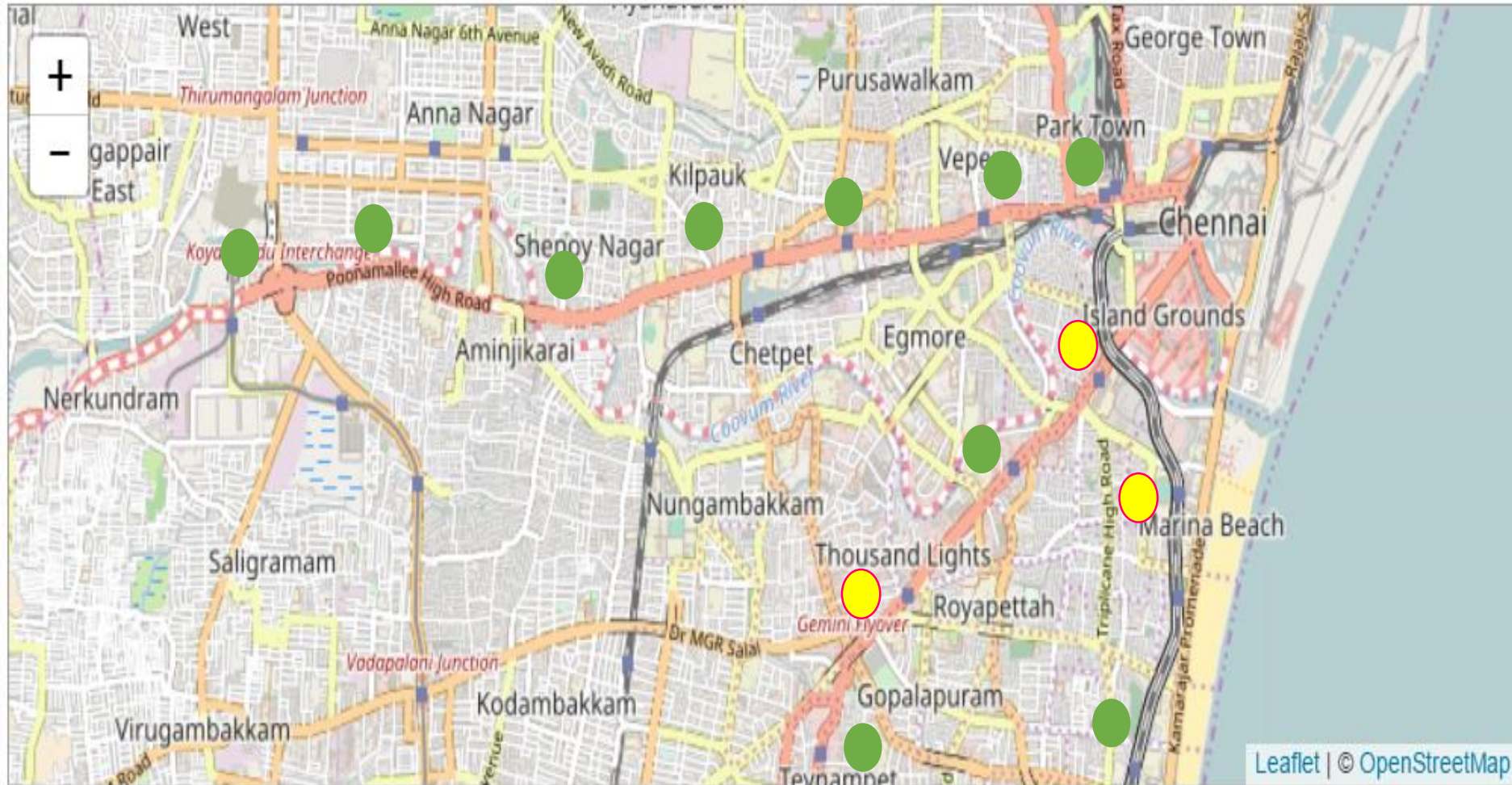


11.30



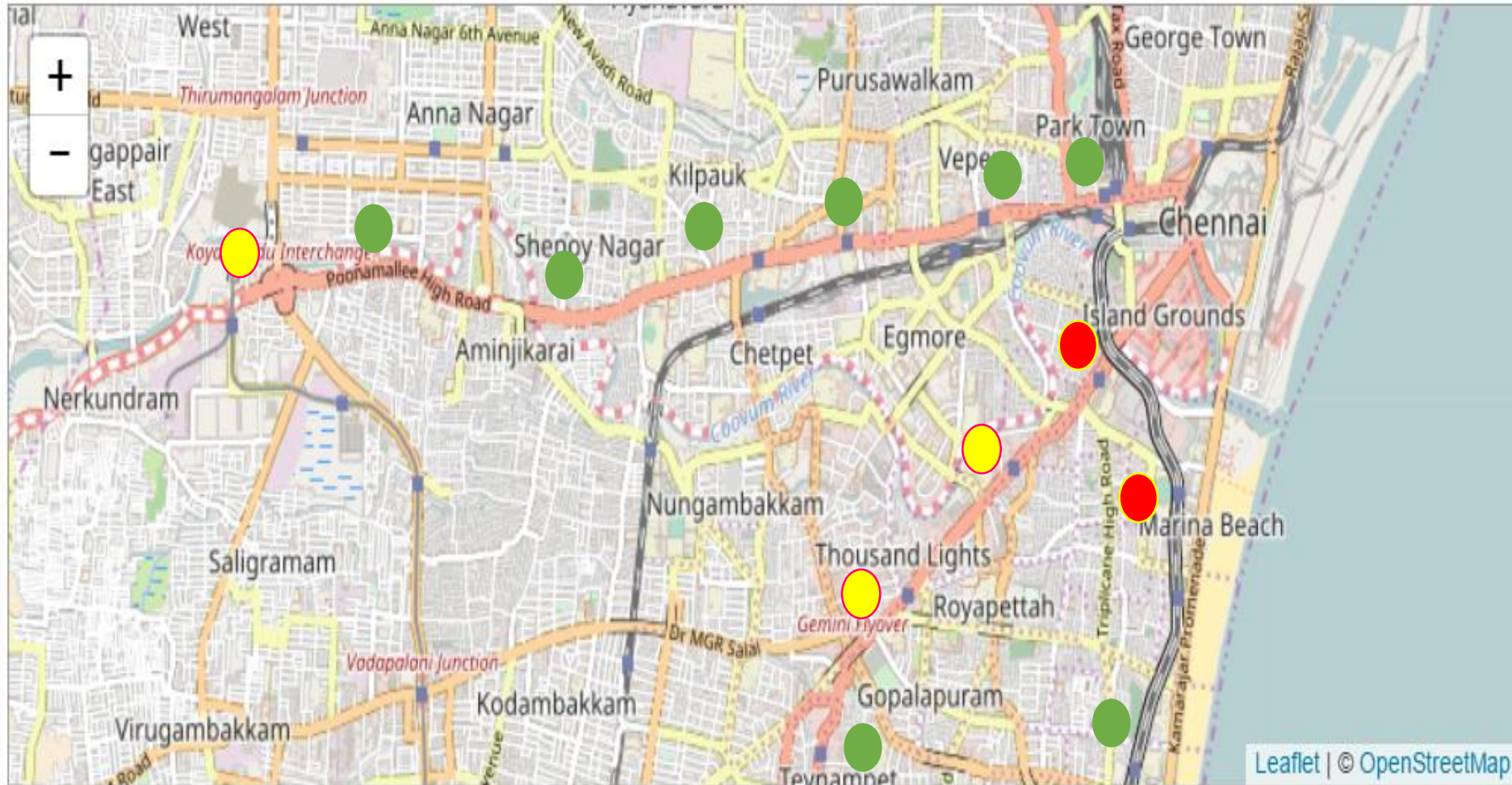
Three towers show 10% more than monthly average

12.00



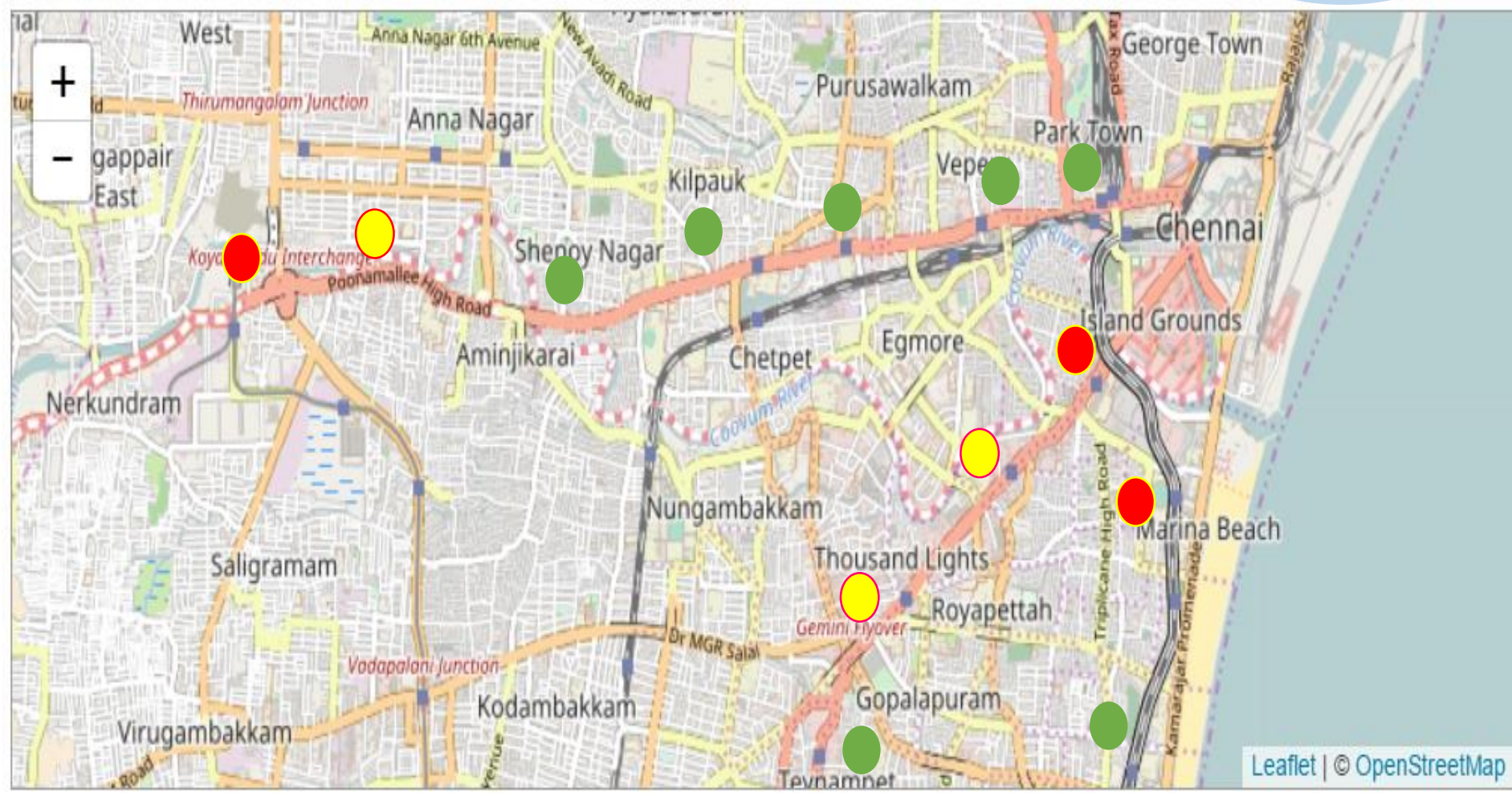
Two show 25% more than monthly average – potenti

12.30



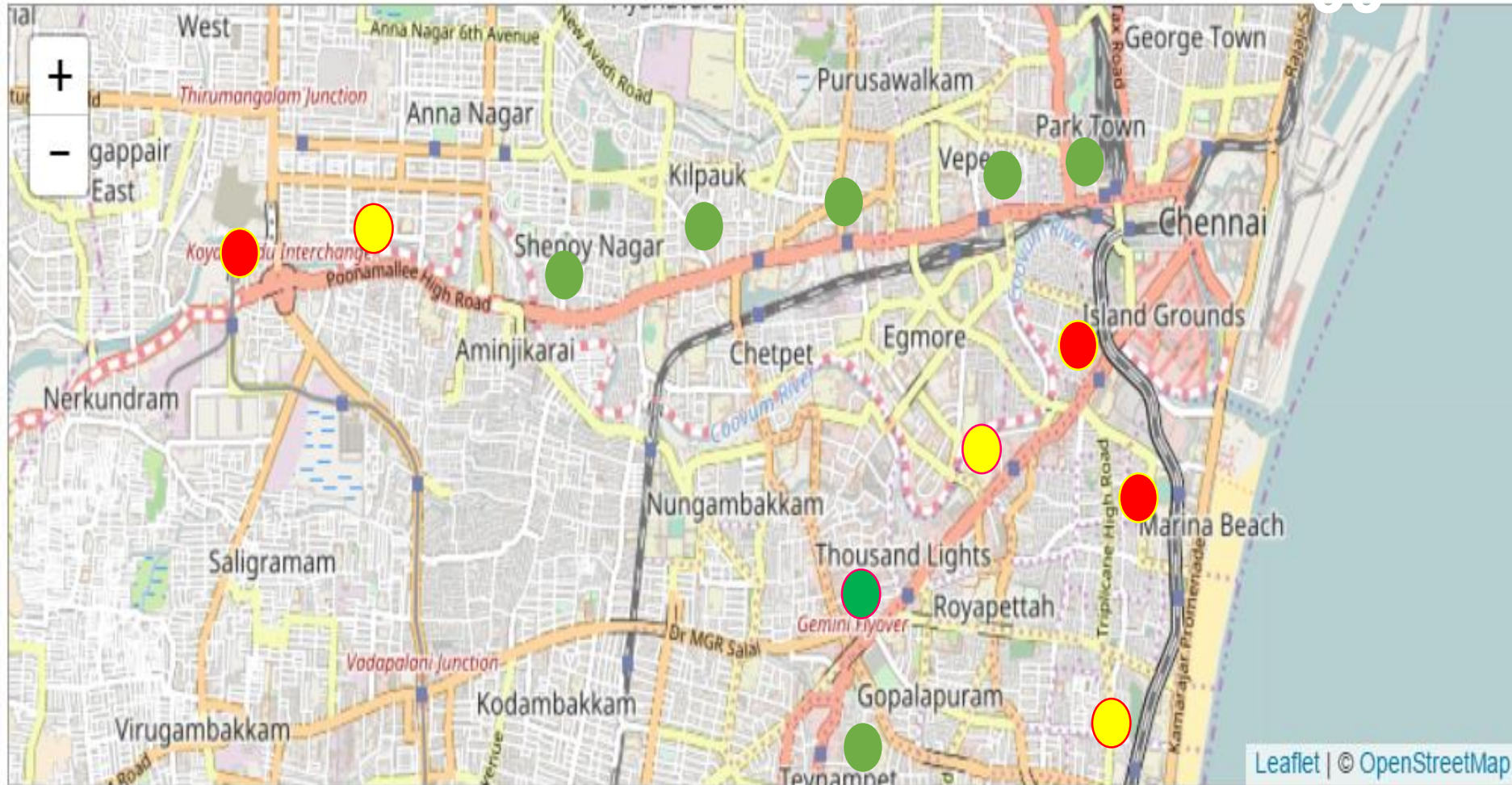
Two different areas in city now show 25% more crowd

13.00

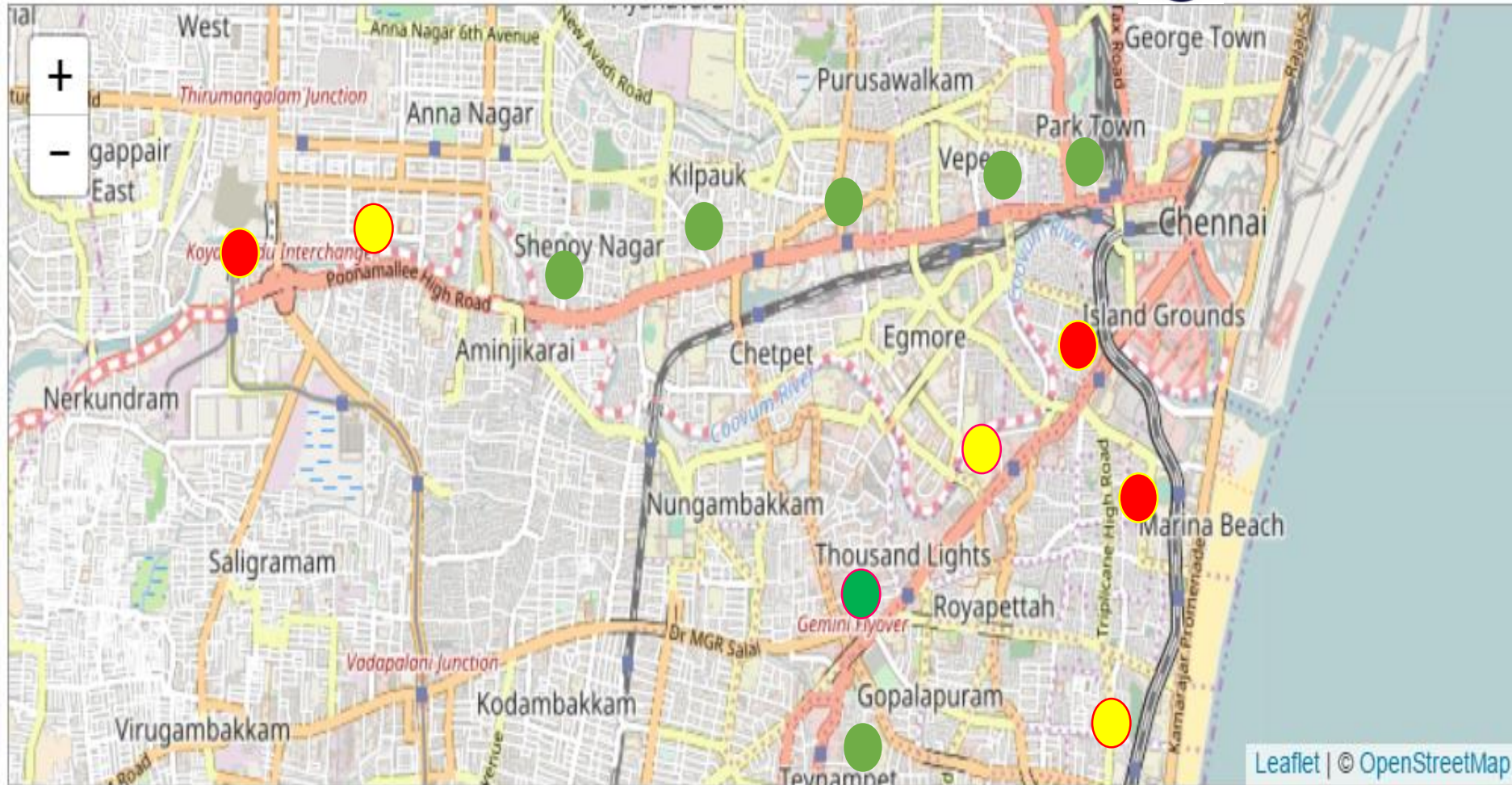
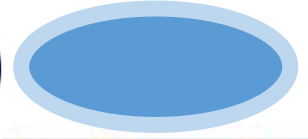


For the last 2 hours, crowd stays there!

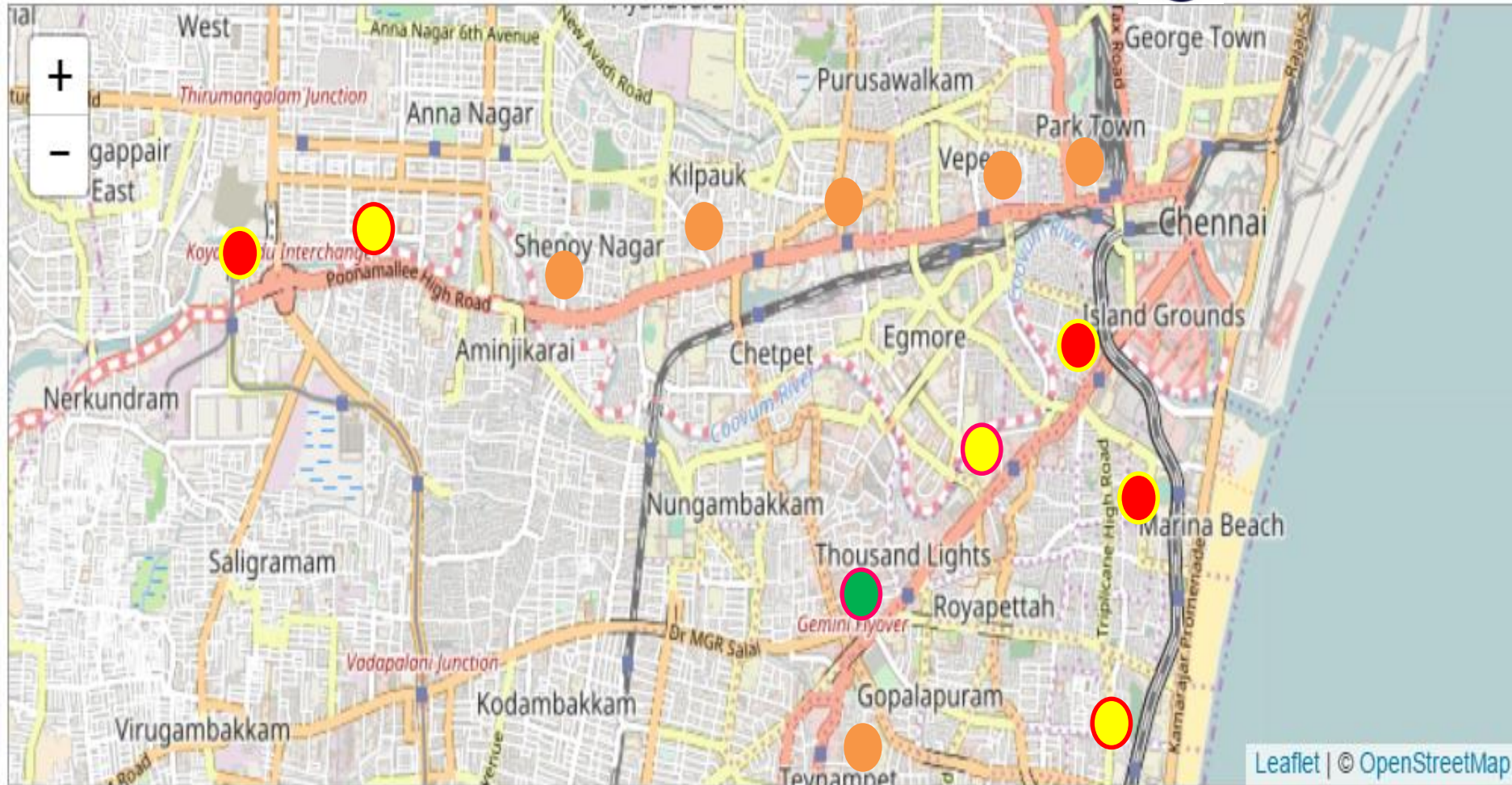
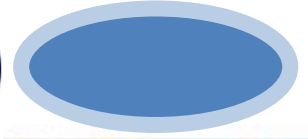
14.
00



There is a movement of crowd on a specific path



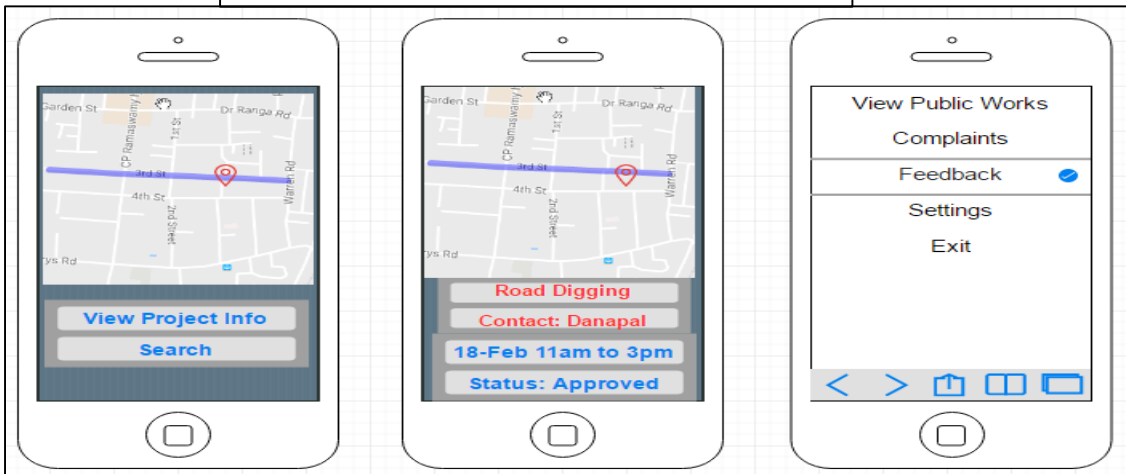
There is a movement of crowd on a specific path



Case Study: Jann-Ki-Baat

Disclosures, Complaints, Feedbacks For & By Citizens of India

Mobile App With Geo Tagging



Artificial Intelligence Components:

1. Multi Lingual Text Processing
2. Language Processing - Properly route the complaints to the right department/category.
3. Many Many more....

The Process:

- All sanctioned Government Public Works Projects Geo-Tagged.
- Ms./Mr. Citizen opens the Mobile App, can view all projects in that area
 - Can submit feedback on progress.
 - Can submit complaints, suggestions and upload photos anonymously
 - Track status of complaints with automatic escalation

A VERY LOW HANGING FRUIT !!!

Section 3 :-Enablers

- General enablers
 - Positive Social Attitudes and trust in AI
 - Data literacy
 - Digital Data Banks, Market places and exchanges
 - Policy for proper use of data
- Domain wise enablers
- Use of indigenous assets such as Aadhar, IRNSS, Bhuvan (IT readiness + Scale)

Responsible Use, Ethics and Social Safety

- Explainable behavior
- Engineered for Safety and Security
- Rigorous audit and transparency of construction
 - Performance, including learning, must be auditable
- Standards related to
 - Robots, Human-Machine Interaction
 - Participation in international standard setting, say on autonomy of weaponized platforms

AI And Employment

- Politically most sensitive issue
- Looked at specific areas: Advisory solutions, Health care, IT Services/BPO; a case study (XLPAT) of job impact.
- Our conclusion: net impact will be positive.
- Inter-disciplinary character, data curating is labour-intensive, new businesses, human/social capital accretion.
- RESKILLING is key; need India-specific models.

TT Consultants and XLPAT – Case Study of Man-Machine collaboration to achieve efficiency and cost savings for global clients while reskilling current workforce and hiring workers



High quality Intellectual Property and Innovation support services

Services Offered:

- Prior Art Search
- Invalidity Search
- Landscape/Whitespace Analysis
- Patent prosecution
- Litigation searches
- Patent licensing Support
- Infringement Search
- Portfolio ranking
- Competitor benchmarking
- R&D search support activities

TTC employs engineers, postgraduates, business analysts with routine work of reading, analysing and preparing reports for global clients by manually analyzing scientific journals, patent as well as R&D literature



Problem with current way of technology

- No single platform for global patents and NPL searching
- Tech documents in different languages
- Data scattered across multiple databases
- Manual intensive & time consuming

Need for faster, automated and more intelligent technologies



Internal XLPAT Algorithms + 10 Years of our experience in IPR

Saves 92% of patent research time using AI and machine learning techniques of XLPAT

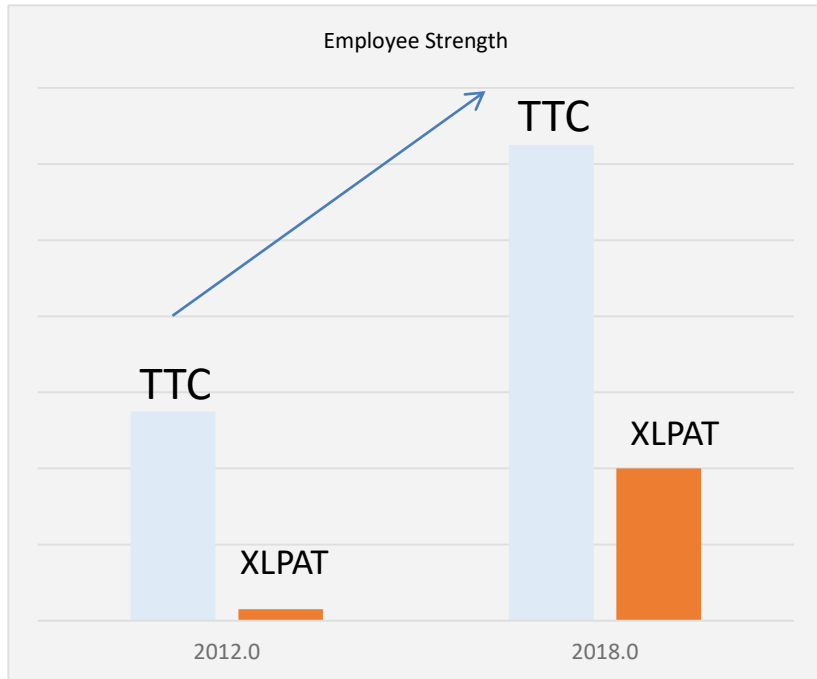
TTC + XLPAT Labs

Analytics

Automation

One Stop platform for technology search and advanced analytics

TTC (IP services company) employee strength increased after XLPAT (IP Software Company) introduction in 2012



With the introduction of XLPAT in 2012, employee strengths of both the companies increased due to following reasons:

- With automation, output to the client increased as scalability of operations expanded
- More workload carrying ability with automated analysis assisting the manual team leading to more productivity.

- Engineers were retrained on new skills to make them efficiently interact with machines
- With AI doing part of the engineers job, they can spend more time on innovation and research to make new products
- Engineers increased their learning capacity to upscale the client reports
- New skills set were created to fill the gaps for which XLPAT hired fresh resources (UX designers, Testing engineers etc.)
- Automation and Manual inputs resulted in higher growth rate for the organisation



Omnipresent Robot Technologies Pvt. Ltd. is a Startup based in Delhi. They have been consistently providing drone based, robotics or computer vision based solutions to an array of clients.



Construction underway, fly drones to make 3D models, compare with target and get accurate progress assessments.



2D Mapping of cities for Urban Development Planning and maintaining record of changes over a period of time



Automatic Volumetric and Area calculation of any stocks such as Cement, Grains etc.



Live Drone Video Streaming services for Inspection or Surveillance by various departments

Current Projects of them with **Andhra Pradesh State Government** –

- Andhra Pradesh Innovation Society (Drone Manufacturing Hub)
- Andhra Pradesh Capital Region Development Authority (Videography)
- Andhra Pradesh State Skill Development Corporation (Skill 1000 people every year)
- Andhra Pradesh Capital Region Development Authority (Mapping of Amaravathi)



Videos

- Drone Video Analytics - Contains all Machine Learning based Solutions for drones
- Speedobotix – Constructing Intelligent Robots made easy.
- Omni Nerve Center - Contains the solution package for CCTV video analytics which can be used for monitoring thousands of city cameras and generating automated alerts.
- RoBoat - Prototype for cleaning Water Bodies.

Recommendations

N-AIM

- Inter-Ministerial nodal agency
 - Core Activities
 - Alliances; Identifying concrete projects; National level survey on identification of clean data clusters; AI Challenge funds and Capture The Flag competitions; AI awareness raising at scale and Talent Conferences
 - Coordination of Projects of National Importance
 - Centers of Excellence
 - Promoting interdisciplinary research, offering generic AI Test Bed, large data integration center
- 1200 crs for 5 years – seed money

Other Recommendations

- Data banks, exchanges and ombudsman
- Standard Setting
- Enabling Policies
- Human Resource Development
 - AI Education Strategy
- Reskilling
 - Identification of skill sets required for AI
- International Rule Making
 - Shaping International Policy Decisions
- Bilateral Cooperation

Concluding Remarks

- **AI is like Internet of 1990s**
- **Global rapid growth is imminent**
- **Catching up and leading is the key**