Applications of Big Data and AI in Real Estate
What factors drive property prices?
Evolution – The new data driven world

Given the size and complexity of data, Yuvoh uses cutting edge machine learning models to create predictions and insights for better-informed decision making.
Big Data approach to augment Real Estate information

Additional data is acquired from country specific sources to build a catalogue of market reference points

- **Sold Property Database**
  - Transaction prices

- **Geospatial Features**
  - Distance to points of interest – airport, stations, coastline, hospitals etc.

- **Long Let Rental Data**
  - Rental data for longer term tenancies

- **Portal Listings**
  - 1m+ market comparables from real estate portals

- **Statistical Data**
  - Population density, number of schools etc.

- **Airbnb Listing**
  - 6m Airbnb listings with their occupancy and booking data

- **eAuction Sites**
  - Auction price tracking

- **Social Data**
  - Tripadvisor and other social data platforms for gentrification markers

Yuvoh has been collecting Data for over 3 years. Data points collected for each country will vary.
Yuvoh approach to working with client

Client data received

Clean data: correct for outliers, blanks and erroneous values

Group certain variables (like floor, build year) to reduce the number of clusters

Analyze relationships and statistical properties

Perform feature transformations: get features with high predictive power

Evaluate several models: across regions for price and rentals

Select best performing model

Productionize the model
Distribution of Price / Area and Transformations

Price / Area is in €/square mtr. Square root or log is applied depending on the distribution to make the distribution close to normal.
Choosing your ML model – Explainability is key

- Average of location cluster
- Prediction from build year
- Prediction from floor
- Area in sqm
- Distance to nearest shopping mall
- Average Airbnb rental in 1km radius
- Distance to coastline
- Distance to nearest airport
- Distance to nearest tourist attraction
- Distance to highway
- Distance to nearest park

Black Box or Neural Network models can create challenging explain-ability issues for customer.
Model performance- ML vs Drive-by*

Yuvoh valuations had a very strong correlation to the Drive-by valuations.

Bank valuations didn’t agree with either of the approaches.

* Third-party independent analysis
Trust and Accuracy is required

Valuation densities between Yuvoh ML, Comparable and Client X were plotted. Yuvoh ML valuations performed much better than Comparable model when analyzed against Client X valuations done by a real estate appraiser.
Client Driven Output

i) Line by line valuations for the properties

ii) A PDF for each collateral containing valuations as well as other key insights.

iii) Dashboard technology with greater client interactivity.
Alternative Uses of AI – Sentiment Analysis

Business Intelligence to Lender/Operator - This scalable technology can be applied to thousands of reviews to assess the general opinions of customers in the present day, and throughout time. This qualitative data can reveal the performance of the hotel management, and the impact that changes have had on customer satisfaction, all without setting foot on the property itself - making it ideal for use where many hotels need to be evaluated in a short time frame.
Team with deep industry and technology experience

Manish Shah
Founder / Director

Gautam Pandey
Founder / Director

Back End Engineer

Front End Engineer

Full Stack Engineer

Architecture Engineer

Data Scientist

Product UI/UX

QA / Tester

Marketing Designer

Team Assistant

£35bn+
Mortgage and Credit Assets Management

500bn+
Data Points Collected

3m+
Property valuations

Industry

Coding

Maths/Stats
Yuvoh Analytics won the UK Government Innovate UK Smart Grant competition for March 2020 in partnership with Data Science Institute of City University of London. Yuvoh entered into a Collaboration Agreement with them to work on cutting-edge Machine Learning and AI projects.

**Kevin Ryan**
Research Coordinator
Kevin is responsible for coordinating research and consolidate research programmes within the Institute and to help facilitate collaboration with external partners. His research interests are within the areas of Computer vision, Deep Learning and Bioinformatics. He has recently completed City’s MSc in Data Science where his research explored areas related to image object detection and image sentiment analysis.

**Professor Muttukrishnan Rajarajan**
Professor of Security Engineering & Director Institute for Cyber Security
Raj is currently the Director of the Institute for Cyber Security at City University of London and carries out research in the areas of privacy preserving data management, Internet of Things privacy, network intrusion detection, cloud security and identity management using blockchain. Raj has received funding from EPSRC, Royal Academy of Engineering, European Commission, Innovate UK, British Council and industry to carry out research in cyber security.

**Professor Artur d’Avila Garcez**
Professor of Computer Science
DIRECTOR OF THE DATA SCIENCE INSTITUTE
Research Interests:

* https://www.city-data-science-institute.com/*
AVM Business Potential – USA vs Europe

Advanced, integrated multi £bn market with significant players and multiple listed businesses

Top AVM providers

- **Clear Capital**
  - Pvt. ~$100m revenue

- **CoreLogic**
  - Public, ~$1.9bn revenue

- **Altisource**
  - Public, ~$500m revenue, spin-off from Ocwen (large US servicer)

- **ATION DATA SOLUTIONS**
  - Pvt. ~$15m revenue

- **BLACK KNIGHT**
  - Public, ~$1.2bn revenue

- **VEROS**
  - Pvt. ~$12m revenue

Fragmented, underdeveloped and undergoing incremental adoption with significant potential

Top AVM providers

- **hometrack**

- **CALCASA**
  - Together to the next level

- **urbanData Analytics ANATRA group**

- **CRIF**

- **tinsa**

- **Eiendomsverdi**
Case Study’s

1 – Systemic Bank 1 AVM for NPL Exit – Sept. ’19
- Client - Systemic Bank A
- Engagement – To value 17k (~€2bn) line items of residential collateral via an AVM model as part of a larger NPL exit.
- Outcome - Valuations generated in excel and pdf. €300 / physical v less than €30 for an AVM

2 – Systemic Bank 2 AVM for Accounting – July ’20
- Client - Systemic Bank B
- Engagement – Participated in the final stages of the RFP process for valuation of 73K (~€6.5 -7.5bn) line items of residential and land collateral
- Outcome expected - Valuations to be integrated with bank systems for their own internal reporting and risk assessments.
Contact Details

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