Key Facts and Research gap

Although considerable research has been devoted to detecting the rooftops of buildings, rather less attention has been paid to creating and completing a 3D city model in terms of the computation of real shadowing and roof/surface brightness.

Therefore, there is a need to

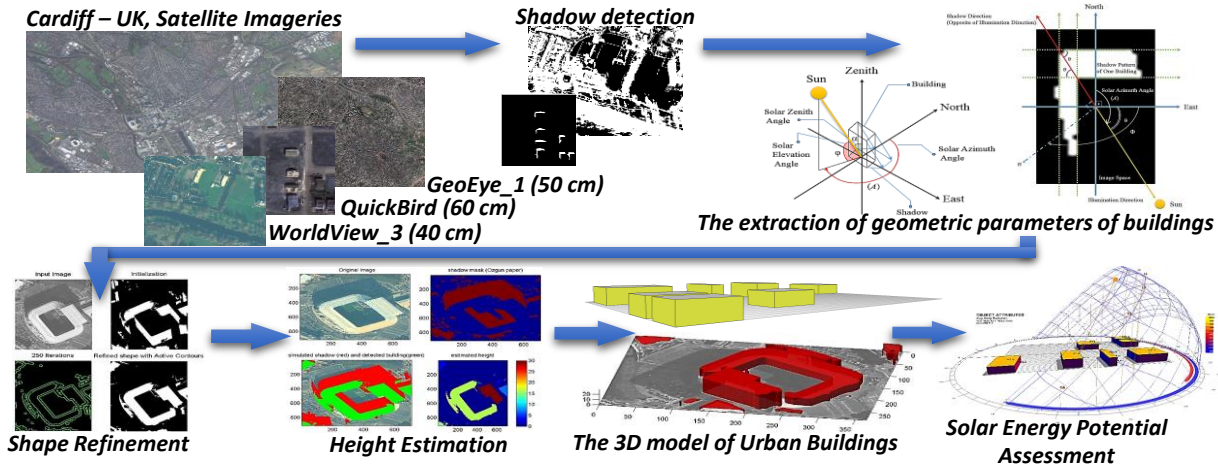
- Increase our understanding of the solar PV potential of surfaces and roofs through creating 3D visualisation of buildings as solid blocks
- Maximise the ability to exploit the solar energy potential in a city
- Compute real shadowing, obtain the knowledge of illumination direction & the envelope of the shaded zones with high solar radiation

Overarching Research Questions

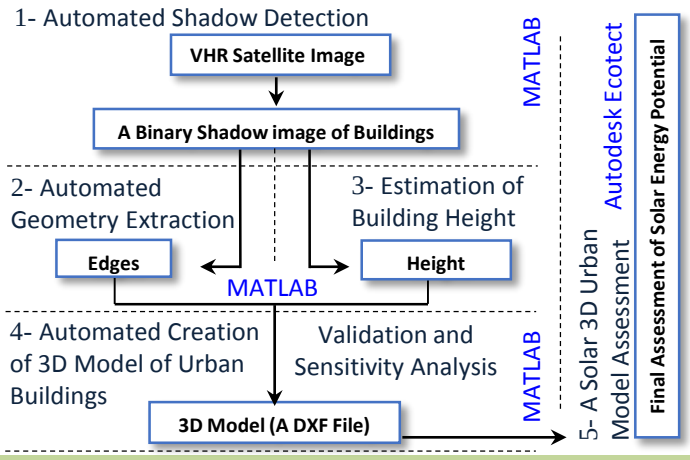
1. Can the Earth Observation data be used effectively to extract significant information to support sustainable urban development in cities?
2. How can the derived information from a single very high resolution (VHR) multispectral image be used to implement the 3D model of urban buildings?
3. How can the availability of surfaces and roofs buildings for integrated solar installations be estimated and evaluated? (With each main question 2-3 sub-questions)

Research Aim

This research project aims to develop a new approach to model and assess available surfaces for the exploitation of the solar energy potential within an urban environment in an integrated analytical framework.

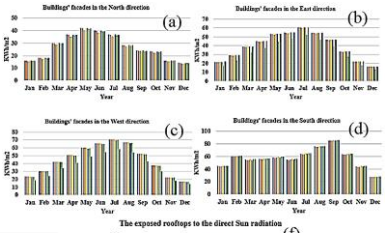


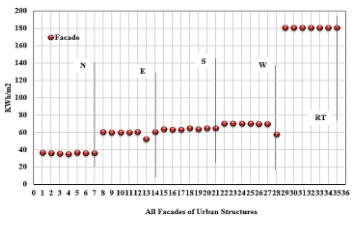
Research Approach (Methodology)



Research outputs

Annual cumulative solar radiation for an exposed surface area of buildings in the north, east, south, west directions





As well as the direct exposure of the rooftops (from the simulation values)

The automated creation of 3D city models from satellite imagery for the integrated assessment and forecasting of solar energy potential

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