
Title: Deep Learning for Building Footprint Change Detection

A number of industries need an up-to-date and accurate building footprints and change map. In real estate, it empowers property professionals and real estate agents to check for any potential adverse possession claims and compliance with approved building plans. In Insurance industry, insurers need to assess damages to buildings in disaster events such bushfire and flooding which requires accurate change detection map.

Mapizy has recently developed a building change detection software solution using the powerful deep learning technology. The deep learning technology being applied have not been utilised previously for image based mapping applications so it is relatively new to the geospatial community.

In the following figure, it is shown how deep learning has identified building footprint from aerial images of 4 spectral bands with 15 cm resolution.



Figure 1. Building footprint detection through deep learning. *Top:* Original image. *Bottom:* Image classification result where black colour represents the buildings.

Once the building footprints are extracted, they are compared to the existing data and meaningful changes are highlighted as shown in the figure 2.



Figure 2. Green: Old data; Yellow: Automated result; Pink: Change detection with change figures in sq meter

Our solution was assessed in a Perth suburban area and the following analytics was reported:

- Total number of parcels in study area : 662
- Number of changed parcels: 107
- %16 rate of change on parcel basis
- Total area of old building footprints: 61,000 sq meter
- Change area : 13,500 sq meter
- Change rate : %18.1
- Accuracy of >%95 plus 0.5 hrs quality assessment per suburb

Our solution’s competitive advantage is its ability to be applied over large geographic areas at a low cost and to be able to be run quickly and easily, particularly after a natural disaster like a bush fire, where estimates of damages and loss of property can be sped up by detecting the changes in building shapes.

Although we applied this solution to aerial images, it can also be extended to other imagery data sources especially AIRBUS Pleiades images where there is high potential for data extraction at mapping grade accuracy.

About Mapizy:

Mapizy is a UWA spin-out company focused on change detection through image data. We are a team of thinkers and doers who are passionate about solving real-world problems with technology. Our software solutions were recognised by the American and UK Society of Photogrammetry and Remote Sensing through technology awards.