

IDENTIFYING WASTE CRIME WITH SATELLITE DETECTION MODELS

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Agenda

- Why we examine waste crime
- Detection models
 - Filtering model
 - Deep learning model
 - Hotspot detection
- Results

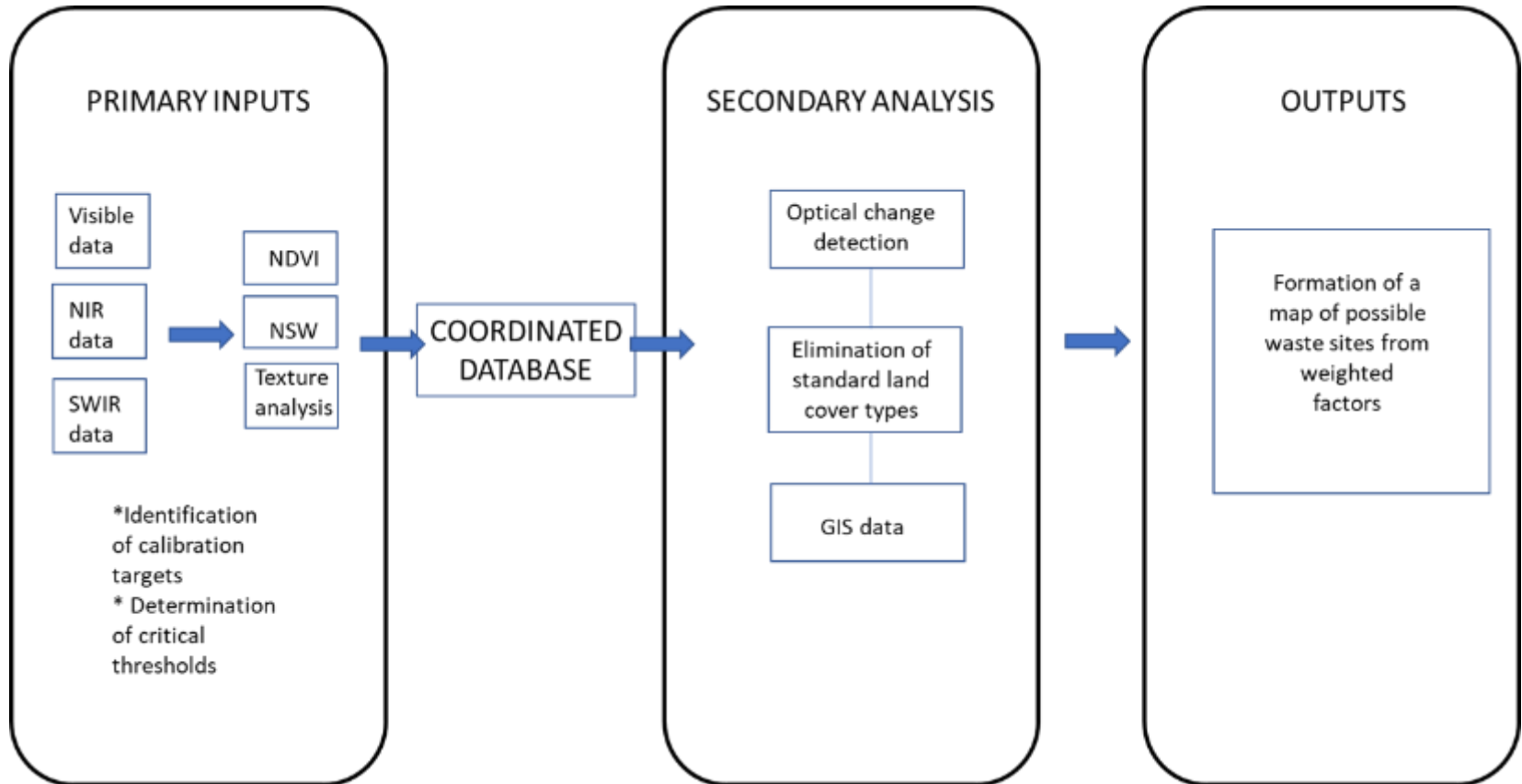
- The European waste market is worth an estimated €129 billion annually
- About 15% of the waste industry is thought to be illegal. A study in England found that 63% of companies advertising online to collect waste were not licenced
- 30% of all waste is thought to fall out of legitimate waste streams
- 24% of all infringement cases by DG ENV of the European Commission now involve waste
- Waste has been labelled the “*new narcotics*”. Increasingly involves organized crime gangs and profits on a similar scale to drugs

Illegal waste sites

- Large amounts of waste are going to unlicensed waste sites. Here the waste is buried, burnt or dumped on the land
- Because these sites are not regulated like licenced waste sites, nobody knows where they are. They often only found through tip offs from the public
- Some European countries are detecting about 1000 unlicensed illegal waste sites each year

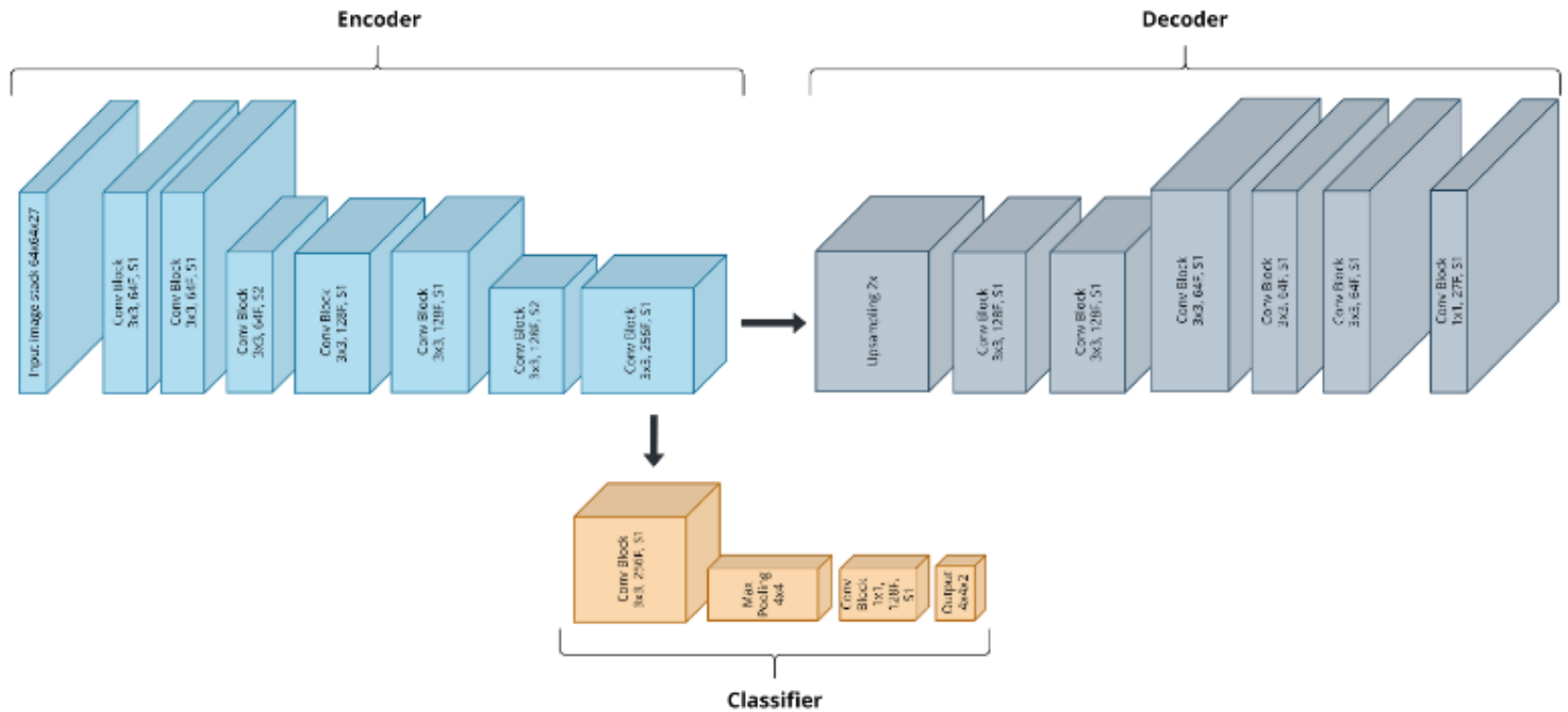
- **Economy.** Waste crime is estimated to cost the economy in England £1 billion each year
- **Climate.** Buried waste releases methane (80 times the warming power of CO₂). Burning waste is probably the second biggest climate change driver (5000 times greater global warming potential than CO₂)
- **Land contamination.** Dumping usually happens on farms, which causes loss of natural capital and impacts on food supplies
- **Water.** High risk of leachate contaminating rivers and drinking water
- **Health.** Investigations have shown that areas where toxic waste is burnt can be linked to significant cancer increases. Also links with asthma and other illnesses

Filtering model



Looking for a needle in a haystack: try and remove the haystack

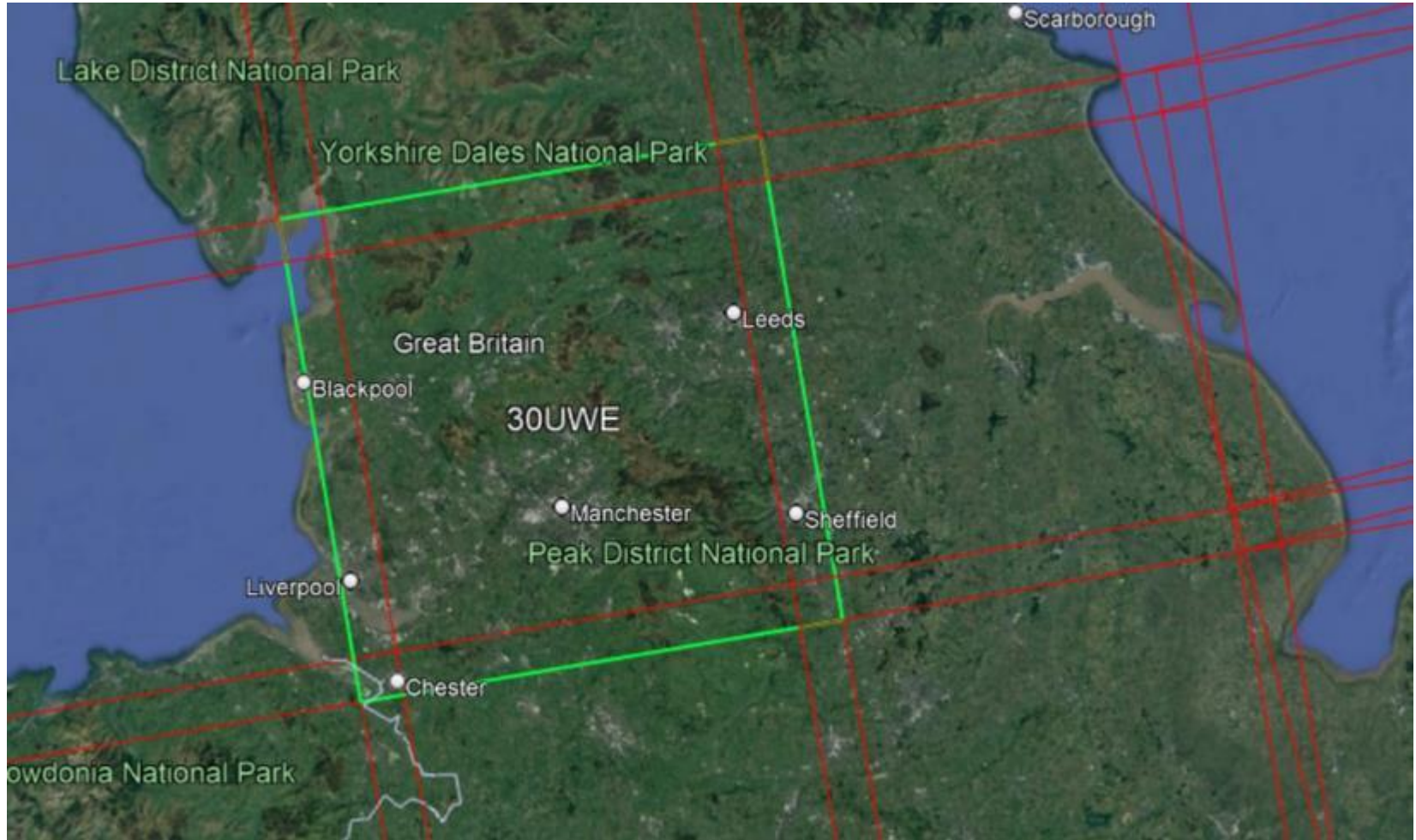
Deep learning model



Sentinel-2 tile coverage



North West England



Potential waste sites



Caird Peckfield Waste Disposal Site



Horsforth Quarry



Site 40
Latitude 53.8406N
Longitude
1.61507W

Horsforth Quarry
with some
evidence of landfill

Illegal site?



Detection Model – High Resolution Follow Up Checks



Athens area potential waste sites



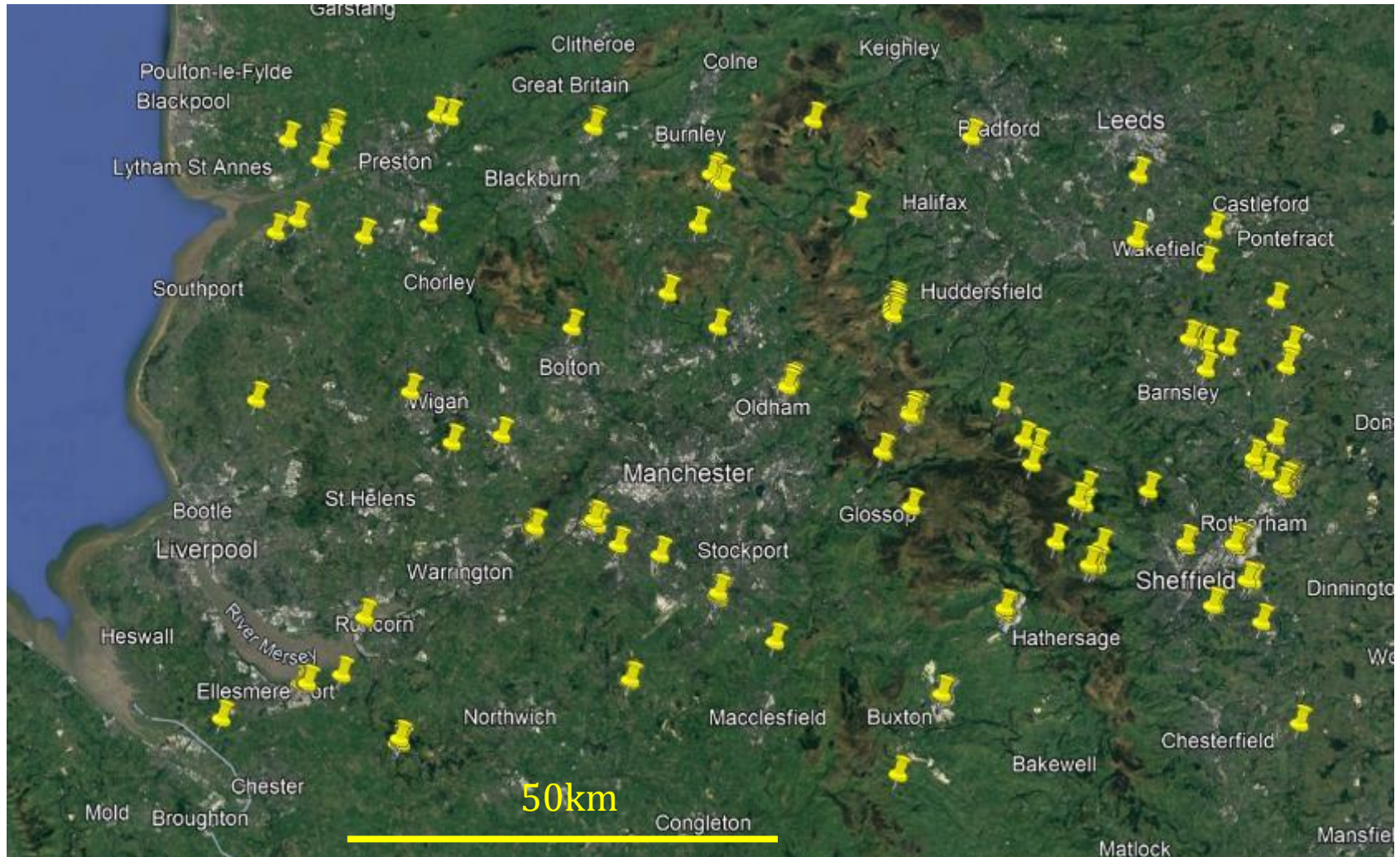
Fili site

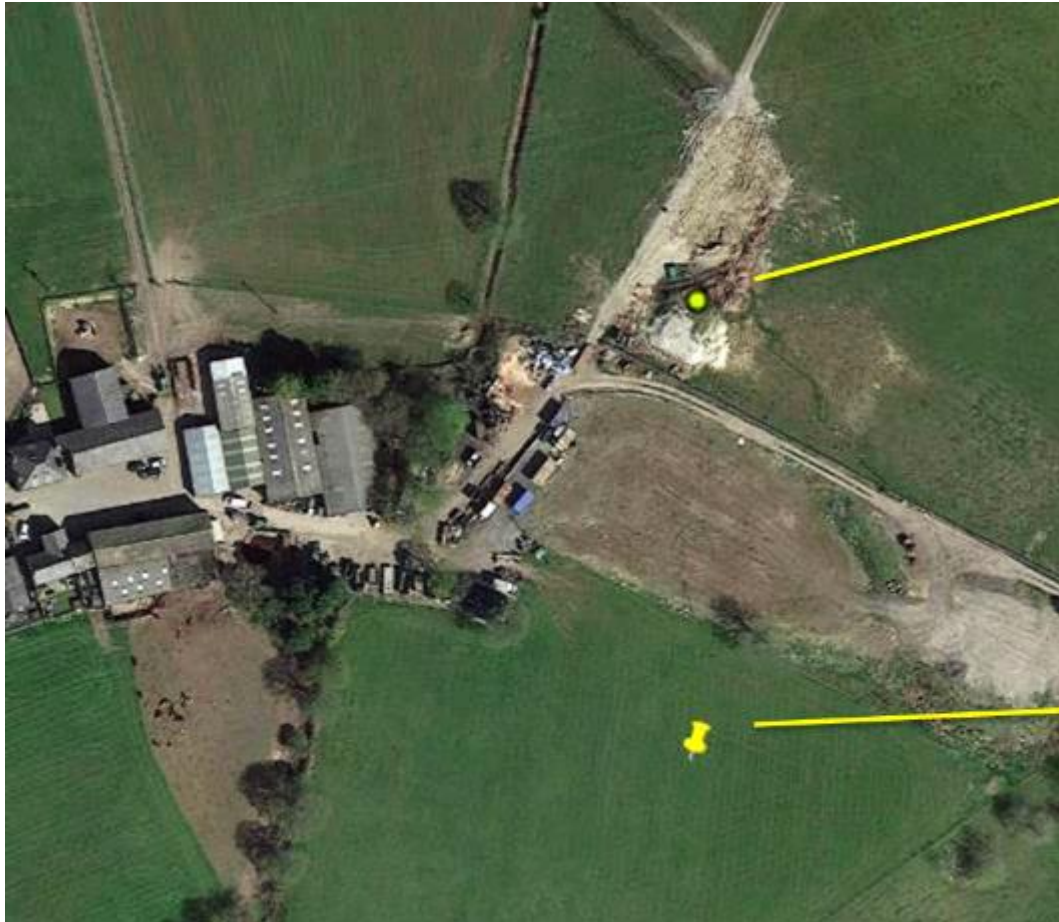


Casual dumping near the Fili site



Hotspots north west England





Detection Model

Hotspot