### Problem types

<table>
<thead>
<tr>
<th>Non sequential</th>
<th>Time series or sequential prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>House price estimation based on size and location</td>
</tr>
<tr>
<td>Binary classification</td>
<td>Diagnose patient based on symptoms</td>
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<tr>
<td>Multi class classification</td>
<td>Classify handwritten digits</td>
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</tbody>
</table>

### Examples of network architectures for different problem types

#### Generic binary classification
- Logistic output unit
- Fully-connected layers

#### Generic regression
- Linear output layer
- Fully connected layers

#### Image classification
- Convolutional layers (optionally with pooling)
- Fully connected layers
- Softmax output unit

#### Language model
- Softmax output layer
- Fully connected layers
- Recurrent layers (simple, GRU, or LSTM)

#### Encoder-decoder for language translation
- Softmax output layer
- Fully connected layers
- Recurrent layers (simple, GRU, or LSTM)
- Embedding layer

### Input/output data relationships

- **one-to-one**: Image classification
- **one-to-many**: Image captioning
- **many-to-one**: Text sentiment analysis
- **many-to-many**: Natural language translation
- **many-to-many synchronized**: Video frame classification

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Recurrent networks can handle variable sequence length. Alternatively, pad/crop to fixed length.

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