Endoscopic Vision Challenge 2018

- Cataract-2018

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Team - MIRL

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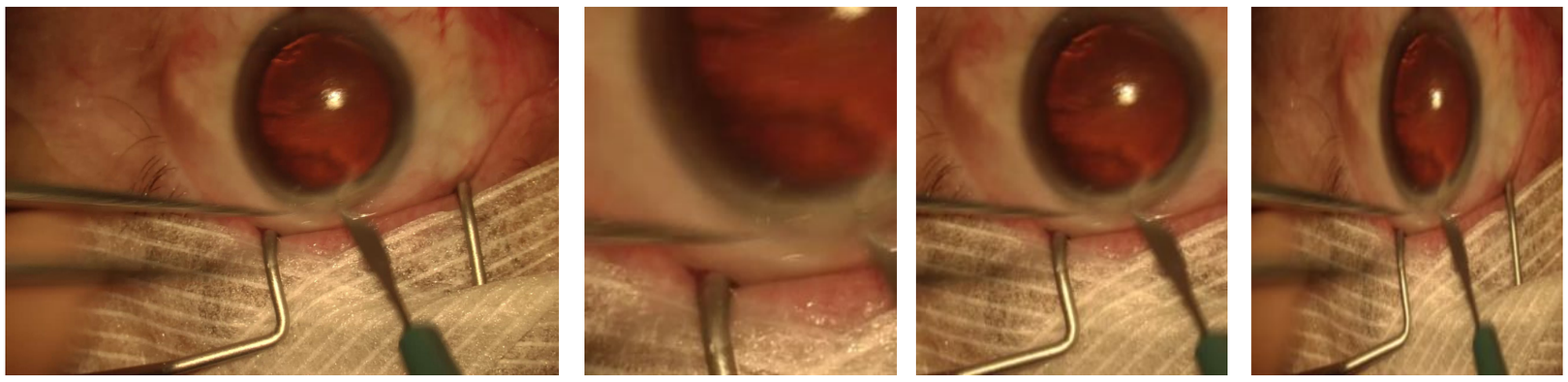
Method

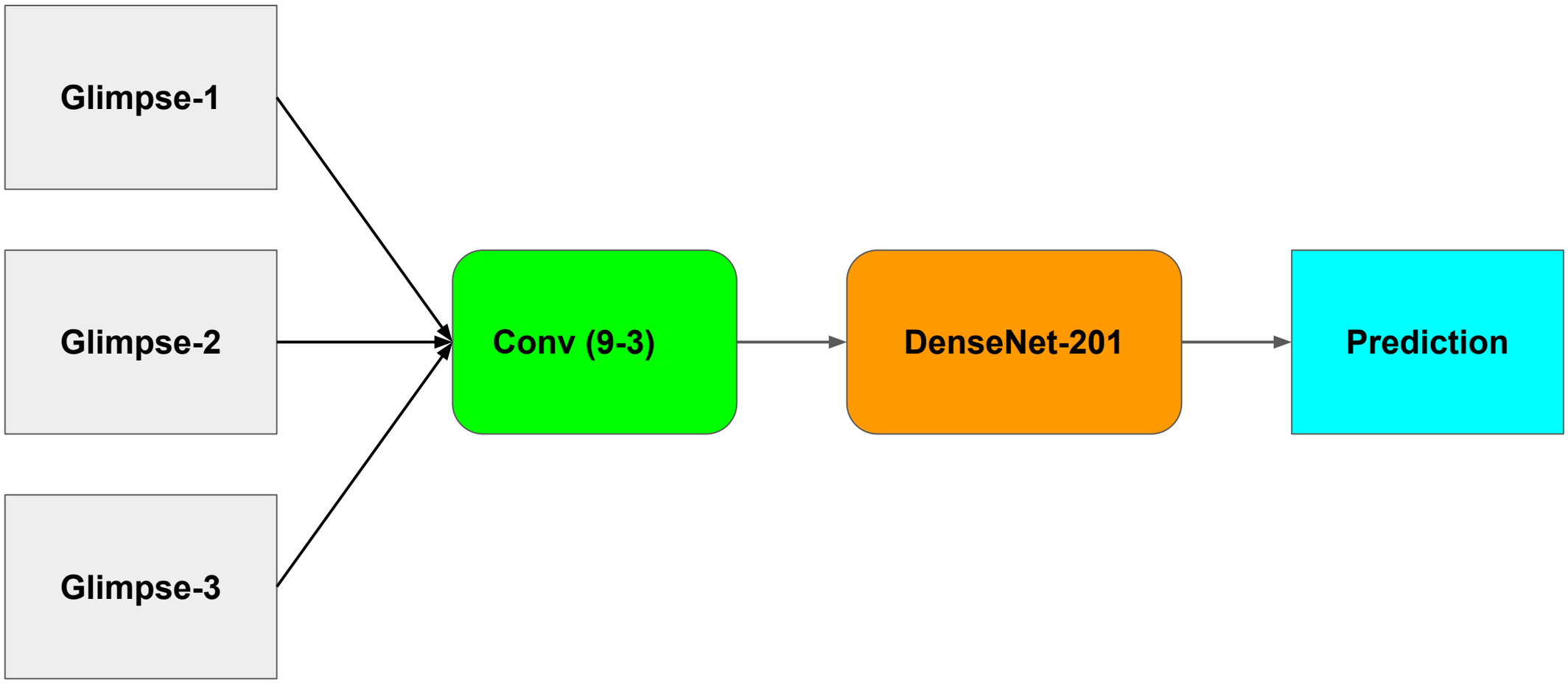
1. A CNN trained with images at multi-scale used to train the network
2. DenseNet-201 forms the backbone of the classification network.
3. Class imbalance in the dataset mitigated by oversampling under-represented classes
4. The input to the network are "**Glimpses**".
5. **GLIMPSE**: Looks at input at various resolution. The network is provided 3 glimpses.
6. **Glimpse-1**: 256 x 256 centre crop of original image.
7. **Glimpse-2:** 512 x 512 centre crop of original image.
8. **Glimpse-3**: Original image.
9. Each glimpse provide local and global information about image at **differing resolution.**
10. Each Glimpse resized to 224x224 and stacked to form input the network.



Original Image **Glimpse-1** **Glimpse-2** **Glimpse-3**

Method

I. 9 channel input fed to network which comprises of one convolution layer which appended to an pre-trained network DenseNet-201



Architecture of model

Results of previous studies

Mean AUROC= 0.9995

Class	Class Wise AUROC
Biomarker	0.99994
Charleux cannula	0.99991
hydrodissection cannula	0.99993
Rycroft cannula	0.9991
viscoelastic cannula	0.9993
cotton	0.9998
capsulorhexis cystotome	0.9998
Bonn forceps	0.9970
capsulorhexis forceps	0.9989
Troutman forceps	0.9983

Class	Class Wise AUROC
needle holder	0.9999
Irrigation / aspiration handpiece	0.9998
phacoemulsifier handpiece	0.9999
vitrectomy handpiece	0.9999
implant injector	0.9999
primary incision knife	0.9997
secondary incision knife	0.9996
micromanipulator	0.9993
suture needle	0.9997
Mendez ring	0.99999
Vannas scissors	0.9999