Task ((WSI) Medical image related)

Digital pathology has emerged with the digitization of patient tissue samples and in particular the use of digital whole slide images (WSIs). Image analysis of WSIs (Whole Slide Images), promises to play an important role in helping the pathologists by indicating potential disease locations and by aiding their interpretation.

These images are very large therefore problem arises in analysing them as a whole. So sometimes they are used as a whole or sometimes they are divided into tiles. However, they cannot be analysed properly further if any pen marks are present on it. Also only the tissue region in the slide is important. To analyse the fine details, various filters and masks are applied on it.

Stain color from one laboratory differs from other. Even though they might be of same organ, same tissue of two images might appear different. Segmentation is used in these images to localize the object. However, due to very less variations in the images visually, it becomes difficult to classify objects and localize them.

Data Provided

Link to Data:

Link to data

Data is present in a folder called, assignment data.

Inside that folder first folder is whole slide images, in which two whole slides images are present.

1. Normal lymph node with an extension of .svs.
2. Reactive lymph node with an extension of .svs.

These can be used for task 1, 2 and 3.

These are the following tasks that one may need to complete with python. And deep learning:

1. Break the Whole Slide Image into tiles or patches(must include more tissue content).
2. Perform image processing, such that resultant sample from two slides are visually same.

3. Two Slides given are of different categories, one belong to normal lymph node, other one is Reactive lymph node. They can be differentiated based on name given to slides. Train an image classification model on these images and show model's performance using graphs, comparing true and predicted results.

NLP Task

Link to website , a website in which contains all the information about organs, tissue. This knowledge is of extreme importance for pathologist.

Make a dictionary using Natural language processing from this website such that each organ name should be the key, and contents present in the organs should be the vaule.

In this website, Textbook Chapters contains the organ names:

TEXTBOOK CHAPTERS			
Adrenal gland & paraganglia	COVID-19	Lung	Prostate gland & seminal vesicles
Anus & perianal	Cytopathology	Lymph nodes & spleen	Salivary glands
Appendix	Ear	Lymphoma & related disorders	Skin melanocytic tumor
Autopsy & forensics	Esophagus	Mandible & maxilla	Skin nonmelanocytic tumor
Bladder, ureter & renal pelvis	Eye	Mediastinum	Skin nontumor
Bone & joints	Fallopian tubes & broad ligament	Microbiology & parasitology	Small intestine & ampulla
Bone marrow neoplastic	Gallbladder & extrahep bile ducts	Molecular markers	Soft tissue
Bone marrow nonneoplastic	Heart	Muscle & nerve nontumor	Staging
Breast	Hematology	Nasal cavity & nasopharynx	Stains & CD markers
Cervix	Informatics, digital & computational	Oral cavity & oropharynx	Stomach
Chemistry, toxicology & urinalysis	Kidney nontumor	Ovary	Testis & paratestis
CNS nontumor	Kidney tumor	Pancreas	Thyroid & parathyroid
CNS tumor	Lab admin & management	Penis & scrotum	Transfusion medicine
Coagulation	Larynx, hypopharynx & trachea	Placenta	Uterus
Colon	Liver & intrahepatic bile ducts	Pleura & peritoneum	Vulva, vagina & female urethra

If I click on any name say Adrenal gland & paraganglia, I'll reach to another page which shows:

Table of contents

General: anatomy & embryology-adrenal anatomy-paraganglia books features to report-adrenal cortical carcinoma features to report-pheochromocytoma / paraganglioma histology-adrenal cortex histology-adrenal medulla staging-adrenal cortical carcinoma staging-neuroblastic tumors staging-pheochromocytoma and paraganglioma WHO classification

Adrenal insufficiency: primary adrenal insufficiency secondary adrenal insufficiency Addison disease adrenal hypoplasia adrenoleukodystrophy autoimmune adrenalitis Waterhouse-Friderichsen syndrome

Adrenal hyperfunction / hyperplasia: acquired adrenal cortical hyperplasia adrenal cytomegaly Beckwith-Wiedemann syndrome congenital adrenal hyperplasia Cushing syndrome hyperaldosteronism macronodular hyperplasia macronodular hyperplasia with marked adrenal enlargement micronodular hyperplasia pigmented adrenal cortical hyperplasia

Other nonneoplastic: cysts (endothelial, pseudocyst, parasitic) ectopic adrenal tissue focal adrenalitis ovarian thecal metaplasia

Adrenal cortical adenoma: adenoma aldosterone producing corticomedullary mixed tumor oncocytoma

Adrenal cortical carcinoma: adrenal cortical carcinoma myxoid variant oncocytic variant sarcomatoid variant

Pheochromocytoma / paraganglioma: pheochromocytoma paraganglioma composite pheochromocytoma hyperplasia-medulla hyperplasia-paraganglia

Neuroblastic tumors: neuroblastic tumors overview ganglioneuroma ganglioneuroblastoma ganglioneuroblastoma, intermixed variant ganglioneuroblastoma, nodular variant neuroblastoma

Other tumors: adenomatoid tumor hemangioma lymphangioma lymphoma metastases myelolipoma plasmacytoma

Adrenal stains: calretinin chromogranin CK7 GATA3 inhibin MelanA S100 synaptophysin TTF1

Here all the words with Blue highlights are many values for keyword ‘Adrenal’

Mention the name of organs for which dictionary is created in a document.