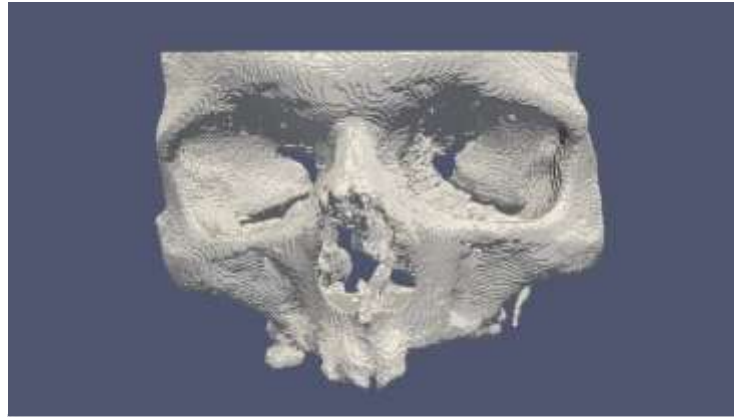


Présentation stage

Modélisation géométrique tridimensionnelle des parois osseuses des sinus aériens chez l'Homme à partir d'images scanner X

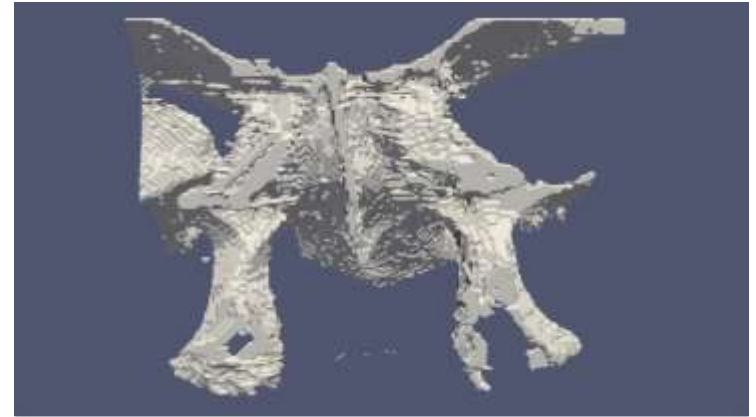


David ABEZA

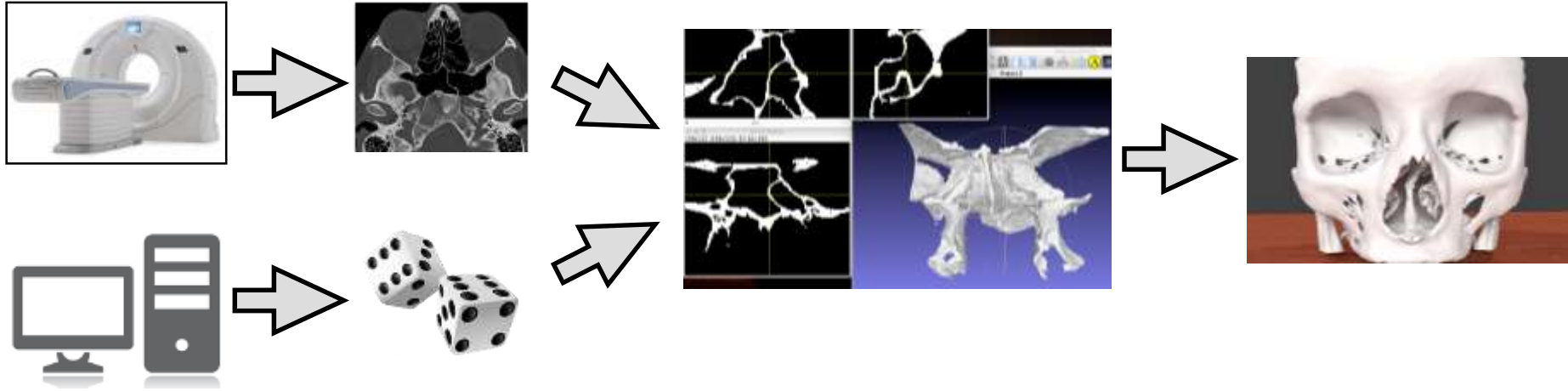
Gérard SUBSOL

26/ 08/ 2019

Valentin FAVIER



Création de modèle



Planification
préopératoire

Entraînement /
simulation

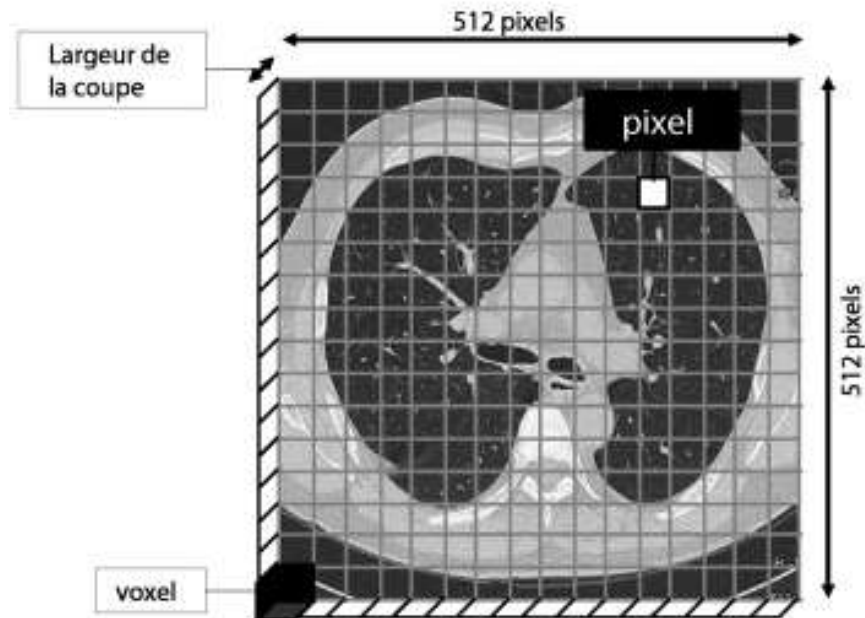
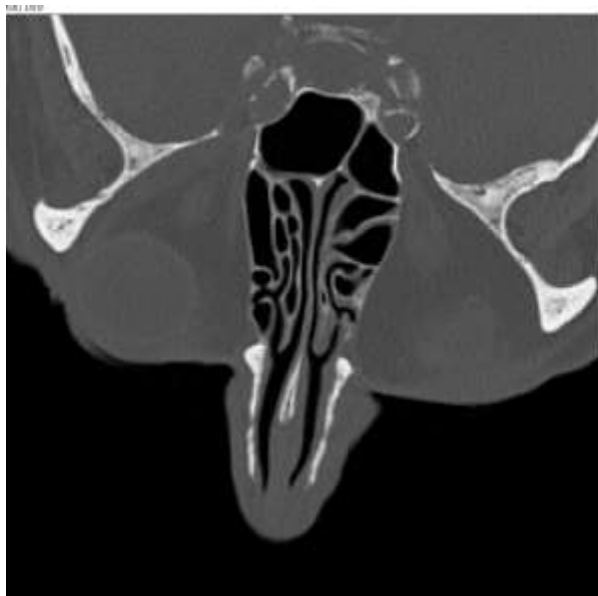
Finalité
Cours
anatomique

Test
dispositifs

Test
techniques

Image 3D d'un scanner X

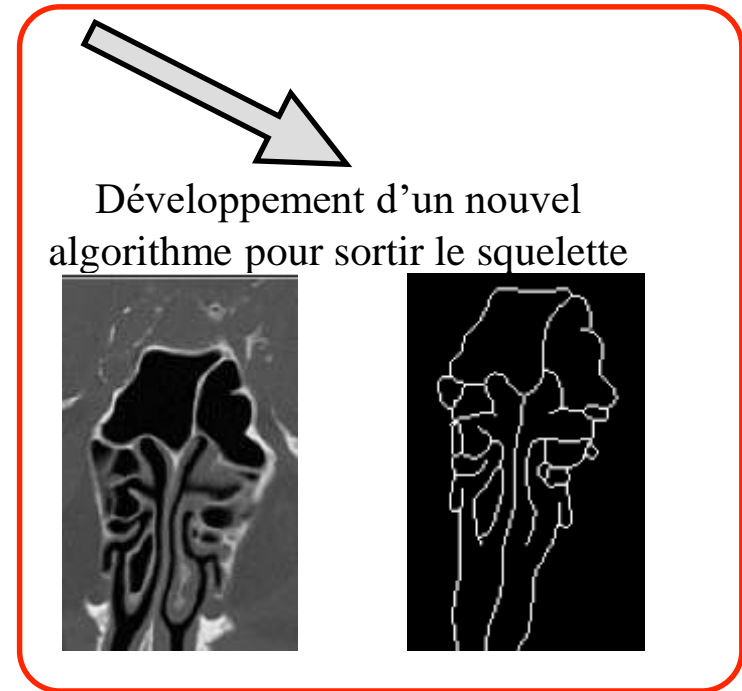
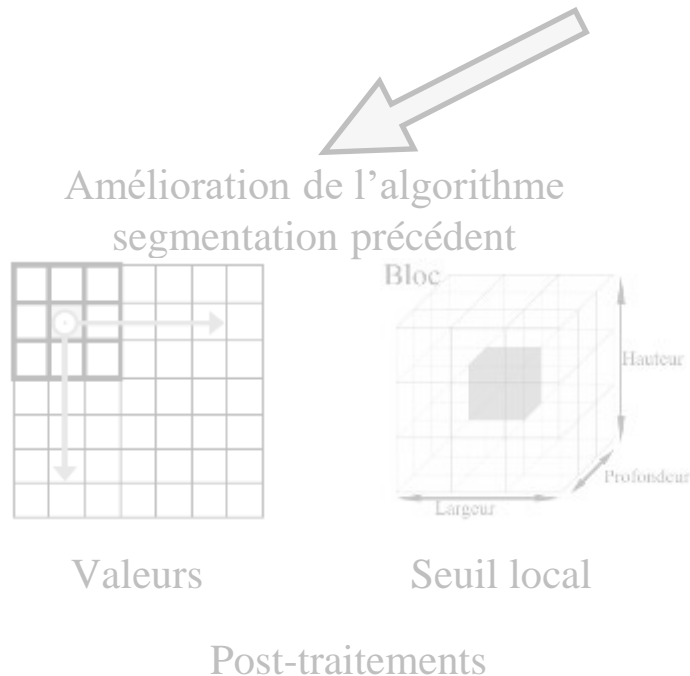
- Matrice 3D
- Voxel
- Image d'absorption RX
- Hounsfield (UH)



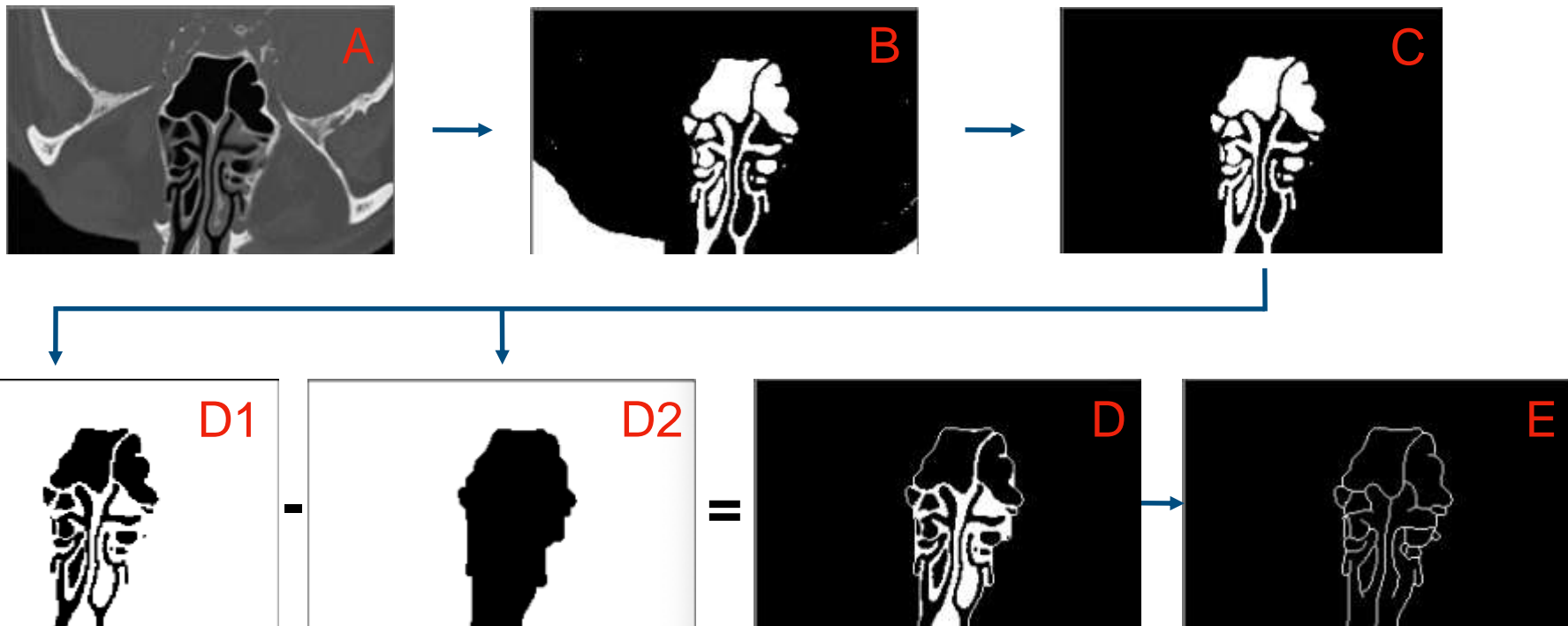
SEGMENTATION

Objectifs de la segmentation

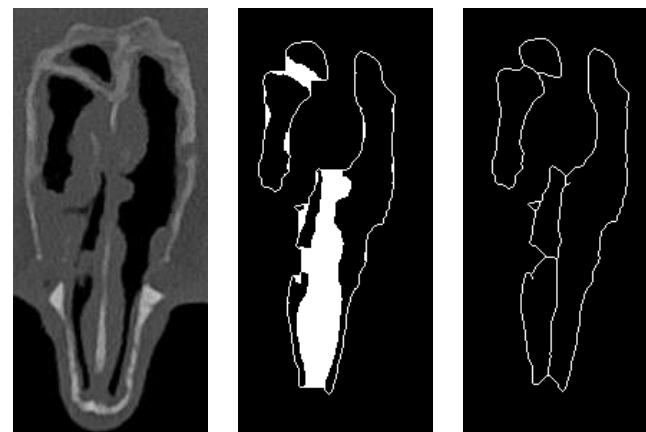
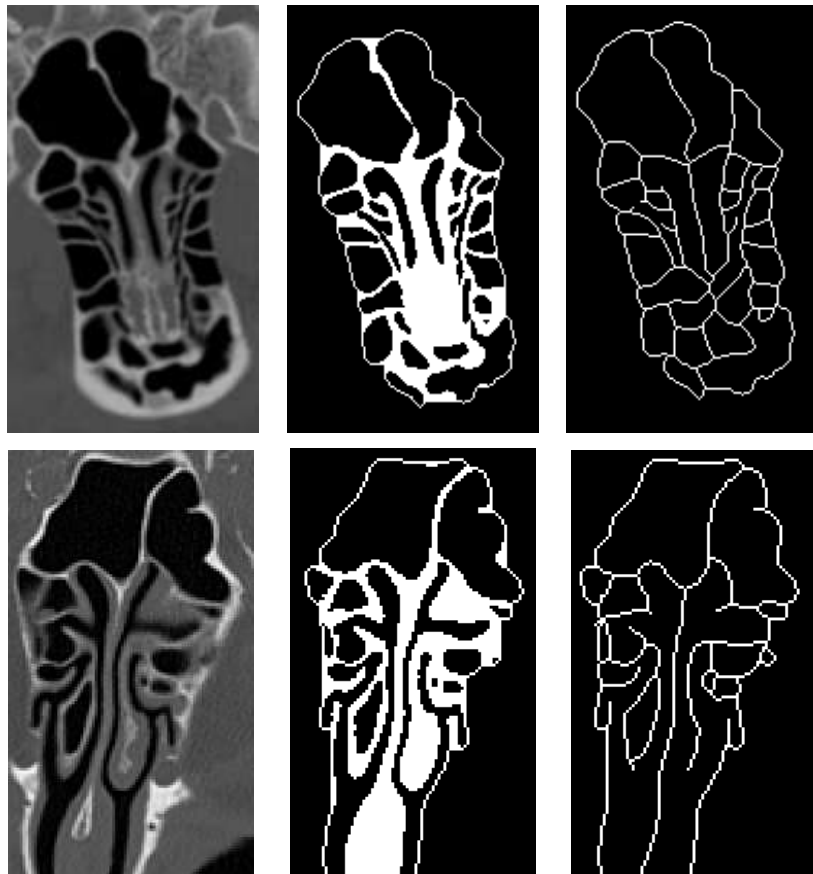
- Algorithme générique
- Limiter les paramètres d'entrées
- Accessible



Principe de fonctionnement



Résultats expérimentaux



Géométrie fidèle

Limiter par la quantité de muqueuse

Combinaisons possibles avec seuil local

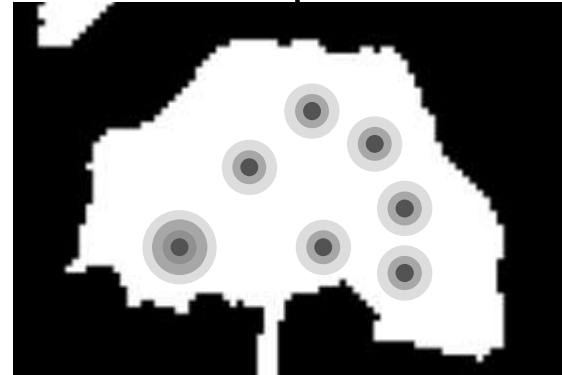
GENERATION PROCEDURALE

Génération de la pneumatisation :

Hypothèse 1 :
Erosion



Hypothèse 2 :
Centre spontané



A l'heure actuelle, le processus de pneumatisation du sphénoïde est inconnue !

Principe de fonctionnement

Sinus plein



Création d'un patron



Génération de la cloison centrale



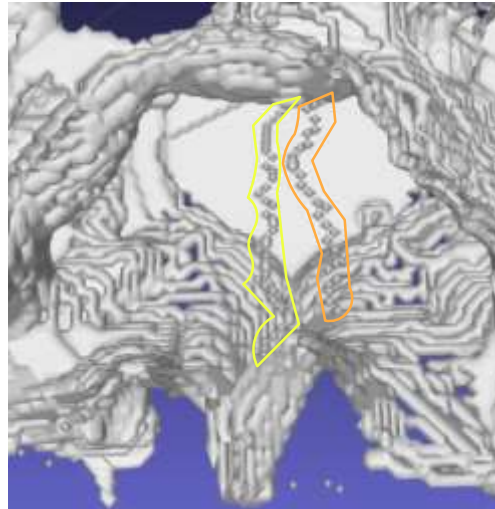
Création des pneumatisations



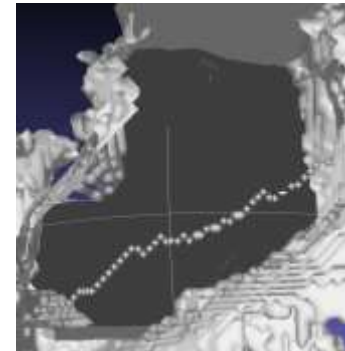
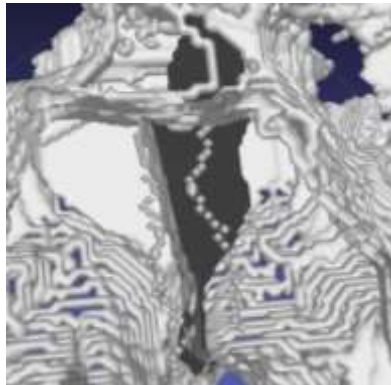
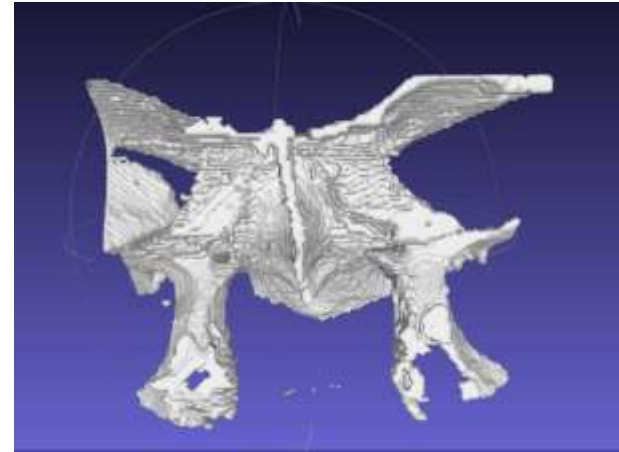
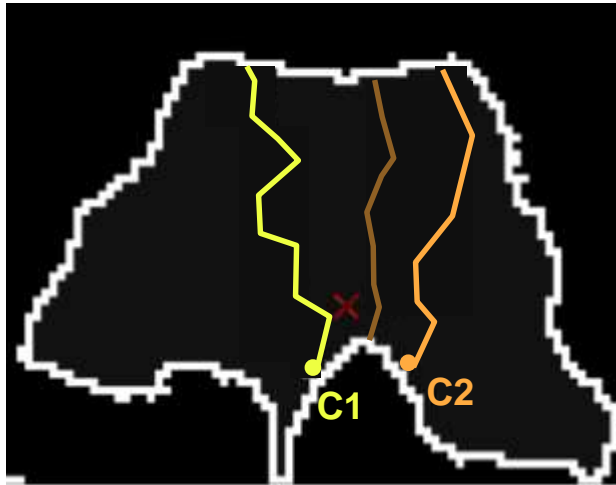
Sortie image binaire



Principe de fonctionnement : Création du chemin

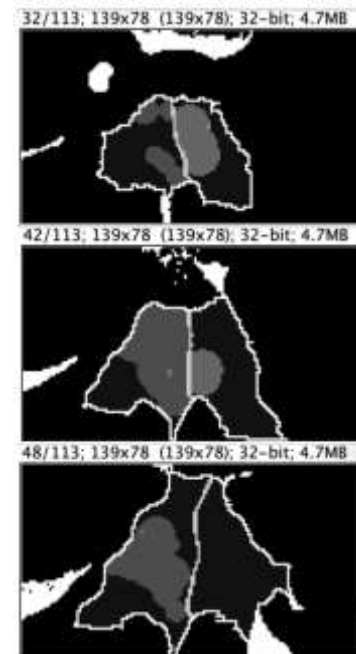
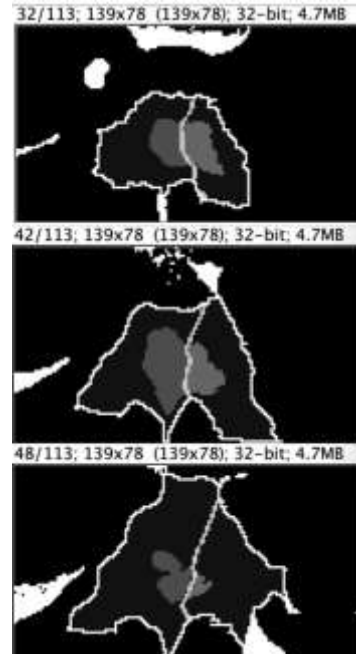
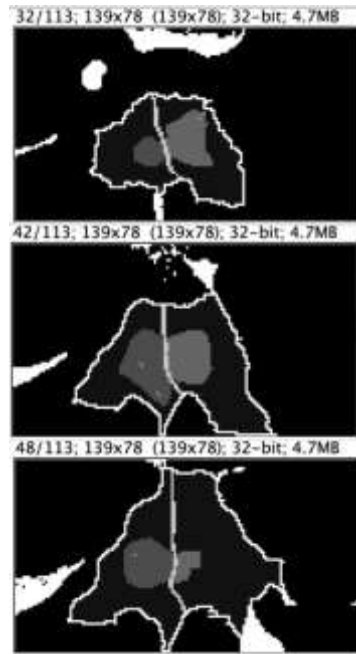
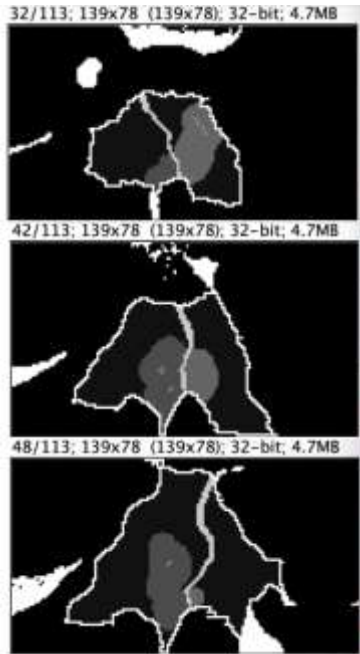


Principe de fonctionnement : Création de la paroi centrale



Principe de fonctionnement : Gestion de la pneumatisation

4 implémentations faites



Objectifs : Tester des pistes de recherches

Amélioration seuil local

Squelettisation est intéressante

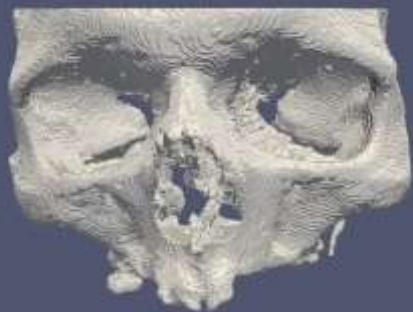
Muqueuse toujours problématique

Paroi centrale jugée réaliste par un expert

Pneumatisations à améliorer

Travail sur la structure externe

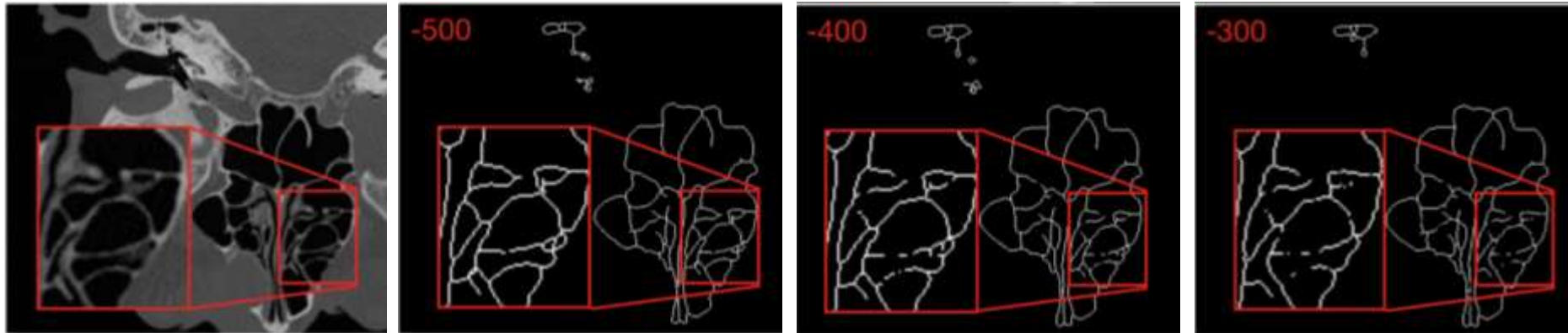
Possibilité de fusion des algorithmes



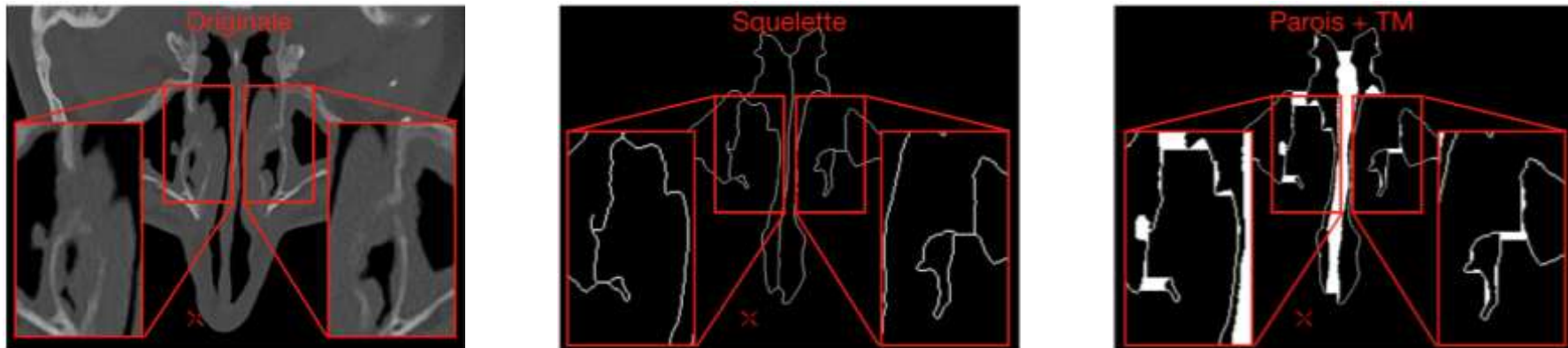
Merci de votre attention



Evaluation du squelette : Importance du seuil d'air

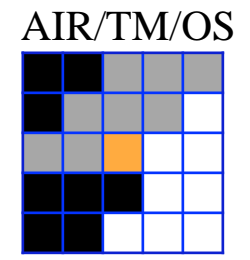
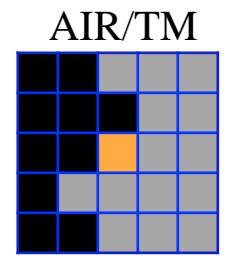
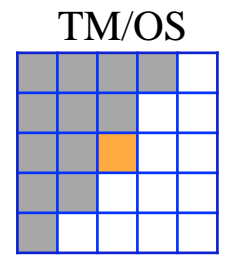
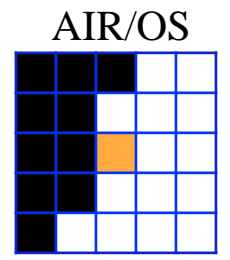
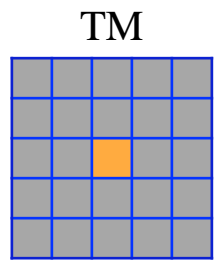
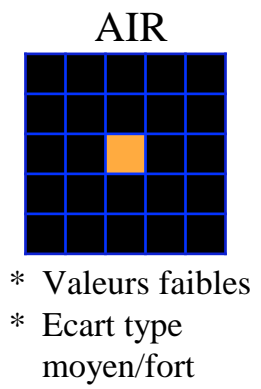
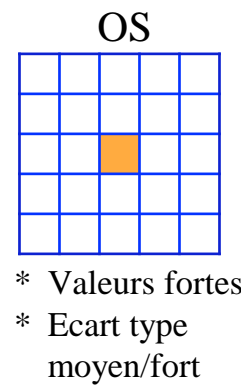
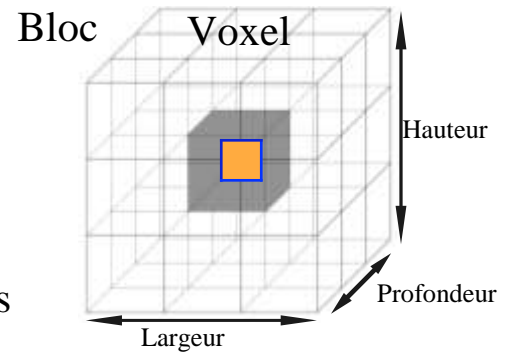


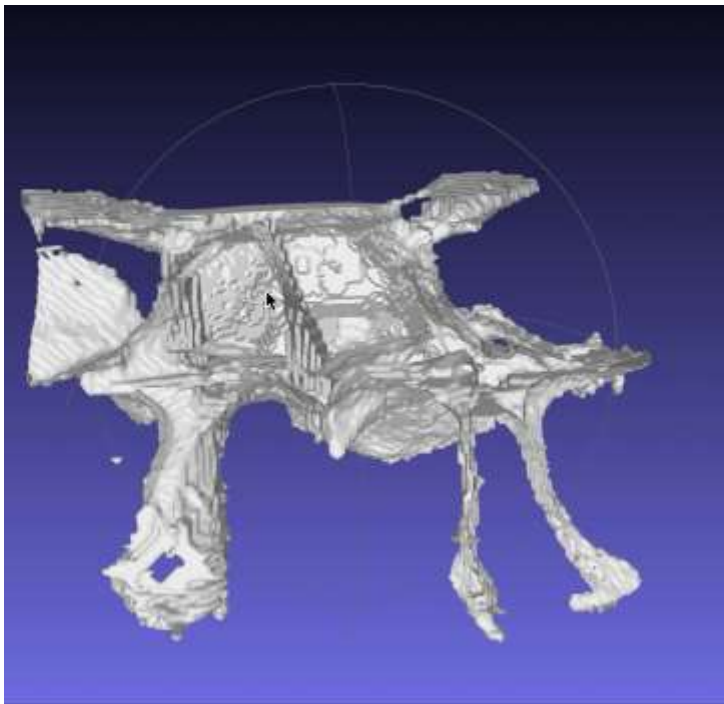
Evaluation du squelette : Problèmes de la muqueuse





- Air
- Os
- Tissus Mous



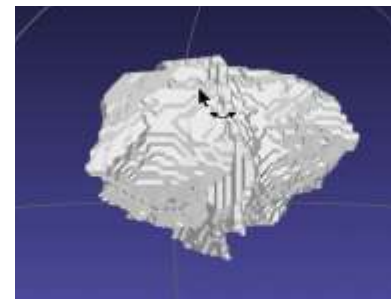
Carte distance, % constant

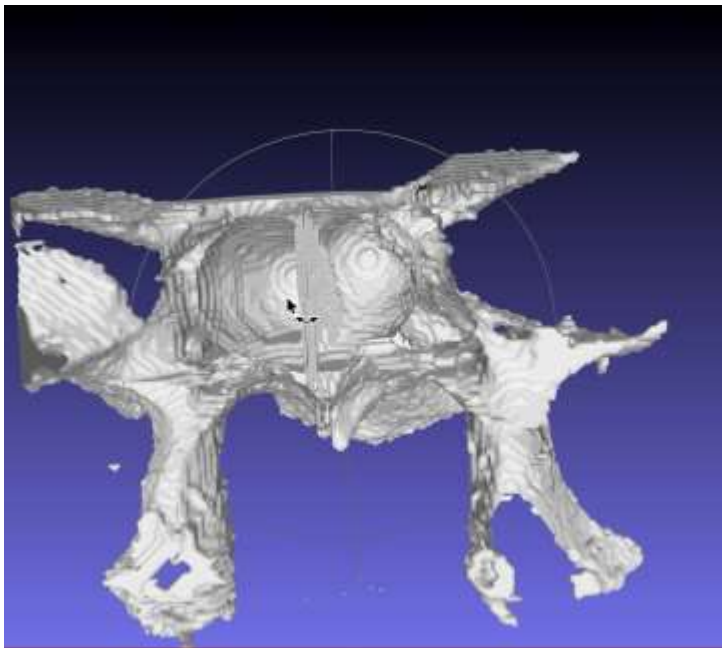
Carte chemin 1

1	1	1
1	1	1
1	1	1

Carte chemin 2

1	1	1
1	1	1
1	1	1



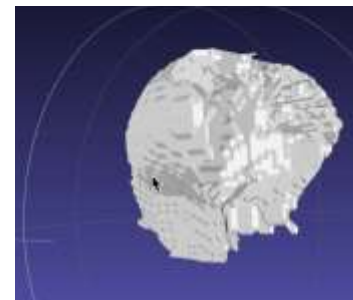
Sphères centrées

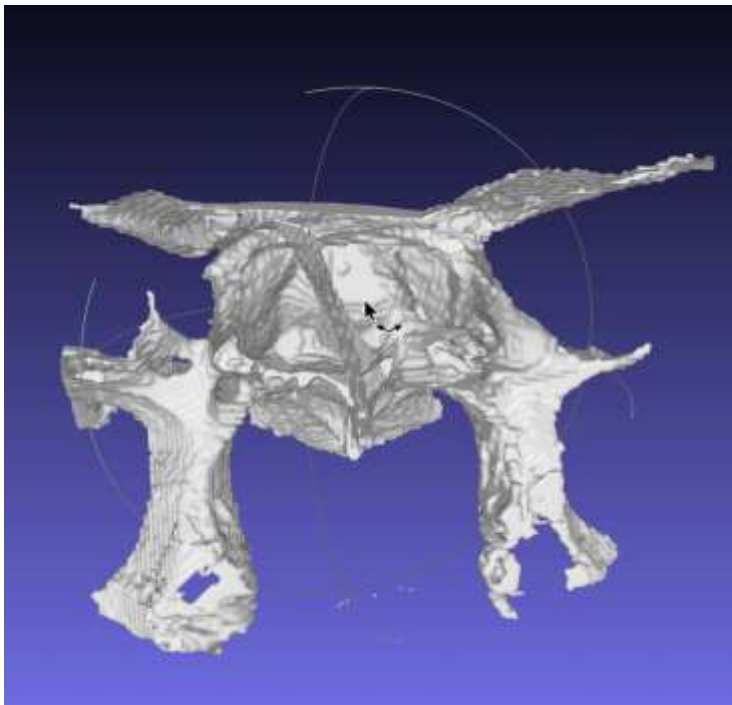
Carte chemin 1

1	1	1
1	1	1
1	1	1

Carte chemin 2

1	1	1
1	1	1
1	1	1



Carte distance, % variable

Carte chemin 1

1	1	1
1	1	1
1	1	1

Carte chemin 2

1	1	1
1	1	1
1	1	1

